NATURE MAGAZINE

SEPTEMBER 1925

35 CENTS A COPY.

NATURE MAGAZINE

PERCIVAL S. RIDSDALE, Managing Editor
ARTHUR NEWTON PACK, Associate Editor
RICHARD W. WESTWOOD, Assistant Editor
R. BRUCE HORSFALL, Artist

SCIENTIFIC CONSULTING BOARD

The following scientists have agreed to act in a consulting capacity for NATURE MAGAZINE; and, as far as practicable, articles dealing with their specialties have been submitted to and reviewed by them, thus insuring scientific accuracy.

VERNON BAILEY
Chief Field Naturalist, Biological Survey
U. S. Department of Agriculture

DR. PAUL BARTSCH
Curator of Mollusks
U. S. National Museum

C. W. GILMORE
Curator of Vertebrate Paleontology
U. S. National Museum

DR. HARRY C. OBERHOLSER
Biologist, Biological Survey
U. S. Department of Agriculture

HENRY O'MALLEY
Commissioner of Fisheries
U. S. Department of Commerce

EDWARD A. PREBLE
Biologist, Biological Survey
U. S. Department of Agriculture

DR. EDGAR T. WHERRY
President, Washington (D. C.) Chapter, Wild Flower Preservation Society of America

DR. WALDO L. SCHMITT
Curator of Marine Invertebrates
U. S. National Museum

DR. L. O. HOWARD
Chief of Bureau of Entomology
U. S. Department of Agriculture

To carry out the purpose for which it was founded the American Nature Association publishes the NATURE MAGAZINE. All receipts are invested in the magazine, itself, or expended directly to promote public interest in Nature. Articles and photographs are desired.

$3.00 a Year

Table of Contents for September, 1925

35c a Copy

Nature Calendar		133
Cutie, A Prairie Pet	Lorene Squire	135
The Romance of Honey	Catherine Beach Ely	140
Notable Fishes of the Sea	Captain J. Menander	145
The Sentry of the Shallows	Ben Hur Lampman	149
Some Reptiles of Panama	Robert N. Davis	153
Murre Multitudes	William L. and Irene Finley	159
American Hydrangeas	Stephen F. Hamblin	164
The Land of the Wild Mountain Goat	William T. Shaw	167
The One Who Talked and the One Who Worked	Percy Munson Barr	170
The Northern Cross in the September Skies	Isabel M. Lewis	172
Long Live King Sequoia	Wallace Hutchinson	174
Nature Education	E. Laurence Palmer	179
Nature Study Review	Elizabeth K. Peeples	181

NATURE MAGAZINE is published monthly by the American Nature Association
Entered as second-class matter, March 4, 1924, at the Post Office at Washington, D. C., under the Act of March 3, 1879
Copyright, 1925, by American Nature Association.
Publication and Editorial Office, 1214 16th Street, Washington, D. C.

General Sir Robert Baden-Powell Founder of the Boy Scout Movement

The Late Sir H. Rider Haggard Novelist

T. P. O'Connor Father of the House of Commons

Judge Ben B. Lindsey Founder of Juvenile Court of Denver

Jerome K. Jerome Author and Dramatist

Frank P. Walsh Former Chairman of National War Labor Board

Major-General Sir Frederick Maurice Director of Military Operations Imperial General Staff

Admiral Lord Beresford G.C.B., G.C.V.O.

Can it be "tommyrot"— when such people advocate Pelmanism?

Here are only a few of many famous men and women who advocate Pelmanism, *and who use its principles themselves.* With this testimony before you, can you doubt that it will benefit you? Find out what Pelmanism has already done for over 650,000 people—send for a copy of the book illustrated below. It will be sent without charge.

Sir Harry Lauder Celebrated Comedian

Granville Barker Actor and Theatrical Manager

Lucas Malet Author

Baroness Orczy Author

Dr. Ethel Smyth Composer

W. L. George Author

H. R. H. Prince Charles of Sweden

Bruce Bairnsfather Author and Artist

NO doubt you have often heard of Pelmanism, but probably you have carelessly thought of it as "just another new-fangled movement. Some more tommyrot! The usual mental-pep stuff!"

Can it, however, be "tommyrot," when such people as those pictured here, men and women of the highest intelligence and distinction—prominent statesmen, artists, novelists, jurists, business men, military men, publicists—advocate Pelmanism in the most enthusiastic terms?

Pelmanism has spread, with the force of a religious movement, all over the world. There is no secret as to how it performs its seeming miracles of regeneration among discouraged people. It takes the principles of Applied Psychology; simplifies them so that they can be understood by everybody, and then arranges them into a remarkable system of mental training.

The results of this system are sometimes almost unbelievable. It helps its users in the most practical way. It changes their outlook upon life; it changes their circumstances. They begin to *accomplish* things they had heretofore only dreamed of. They *do* more, *earn* more. Instances are on record (on file and open to inspection) where income has increased 800, 900 and 1,000 per cent. Yet, remarkable though they may seem, these results can be simply explained.

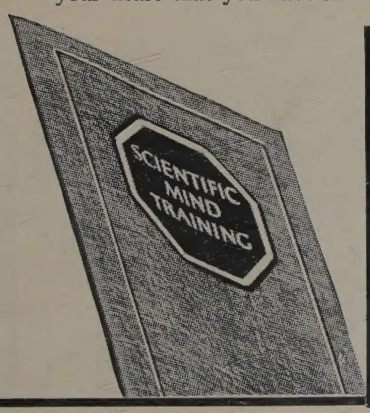
Be honest with yourself. You know in your heart that you have failed, failed miserably, to attain what you once dreamed of. Was that fine ambition unattainable? *Or was there just something wrong with you?* Analyze yourself, and you will see that at bottom *there was a weakness somewhere in you.*

What *was* the matter with you? Find out by means of Pelmanism; then develop the particular mental faculty that you lack. You CAN develop it easily; Pelmanism will show you just how; 650,000 Pelmanists, *many of whom were held back by your very problem,* will tell you that this is true.

The whole remarkable story of Pelmanism is told in a little book, "Scientific Mind-Training." It explains in detail the simple principles; it tells stories—almost unbelievable, some of them—of people whose lives and circumstances have been revolutionized after a short time.

We will gladly send this book to you, free, if you are at all interested in Pelmanism. To ask for it involves you in no obligation whatsoever; you will not be bothered; no salesman will call on you. Send for this book now; when such distinguished people as those shown here advise you to take up Pelmanism, how can you justify yourself if you do not try *to find out,* at least, whether Pelmanism can help you "find yourself"? Mail the coupon below—now before you forget about it.

THE PELMAN INSTITUTE OF AMERICA
Approved as a correspondence school under the laws of the State of New York.
2575 Broadway, Suite 1259 New York City



THE PELMAN INSTITUTE OF AMERICA,
Suite 1259, 2575 Broadway, New York.

Please send me without obligation your free 64-page booklet, "Scientific Mind Training."

Name.....

Address.....

Navy Man says

"Would be cheap at $50"

© 1925, Du Maurier Co.

Our Price for

this 10-Power Stereo-Prism BINOCULAR only $27

HOW can we afford to give this splendid instrument at such a low price? Mr. H. G. Gould, of Northome, Minn., writes: "I cannot see how such a glass can be sold for anything like the price you ask; $50 would be cheap for such a fine instrument!" By a fortunate purchase when francs were low we were able to get enough of these French super-power binoculars so we can now offer them at our amazing bargain price of *only* $27.

Save Money—Order Now

When the few glasses we have are gone this bargain offer may never be repeated. The next lot of these famous glasses will cost more. So order yours now. Glasses have large field, wonderful illumination and definition. Central focusing. All adjustments. Heat and moisture proof. Weighs 20 oz. Case and straps included. We will send you this fine instrument under our absolute money-back guarantee. Just mail the coupon now with remittance. Either the glass satisfies you in every way—or we refund your money at once.

Free Catalog of over 200 glasses—$1 to $125

The world's finest binoculars, 3 to 24 power. Telescopes for sport, observation, target shooting, etc. Most complete line in this country. All BRAND NEW. No "salvaged" war glasses or "seconds."

America's Leading Binocular House

DU MAURIER CO., Dept. 89, Elmira, N.Y.

DU MAURIER CO., Dept. 89, Elmira, N. Y.

You may send me the French 10-Power Stereo-Prism Binocular, as described. I enclose remittance of $27.00, but you are to return it promptly if I decide to return the glass for any reason.

☐ Check this square if you wish us to send our catalog only.

Name.....

Address.....

City.....

Ailanthus Moth

(By *Richard Mather*, 12, *of Paotingfu, China*)

The Ailanthus moth is a native of China but was imported into the United States because of the strong and easily dyed silk spun by the larva. The caterpillar seems to be a lazy old fellow on the tree; but when it comes to collecting him, you change your mind right away, for in less than half an hour you will find him calmly crawling out the back door or some place, at any rate far from where you put him. All this may happen if your box is not securely fastened; but even if it is fastened down tight, he will insist on making a thorough investigation of the place for means of escape, and trying the cracks and corners for doors. After that task he goes to sleep. He then tries the food, probably suspecting some poison.

Even if you are very interested in keeping him, your interest may not last long, for he spends all his time in eating and sleeping. He doesn't stop eating, and start spinning, until he ought to explode, but somehow or other he doesn't. Then he starts spinning! You begin to get excited, but not for long; for he all the time goes to sleep on his job. All of a sudden he starts spinning like a perpetual motion machine, night and day, until he has his house as hard as wood. One might well take it for a piece of soft wood, because of its color.

Next year, in early summer, the moth emerges with a wing-spread of about five inches, and even the body of the moth itself seems bigger than the pupa, but is because of tufts of hair on the moth's body. The female deposits her egg in small patches all over the tree.

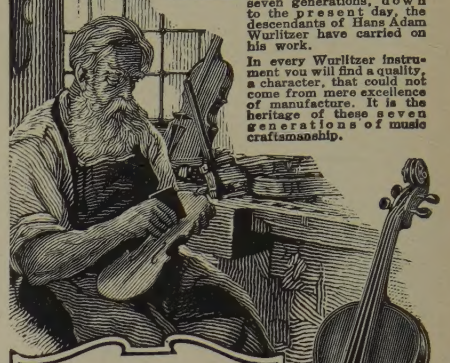
An Undesirable Alien

"The Oriental Fruit Moth is one of the most dangerous orchard pests of today," declare T. L. Guyton and A. B. Champlain of the Pennsylvania Bureau of Plant Industry, in a bulletin describing the bad behavior of this insect pest. The larvae feed on the young shoots of the peach tree, killing them back, and they feed on the fruit of peach, quince and apple, making a wormy product not evident from the outside. Nicotine sulphate containing 40 per cent nicotine used at the rate of one to 800 is the killing agent recommended to be added to the usual peach spray. The pest first appeared in the District of Columbia in 1916, believed to have arrived as a stowaway with nursery shipments of flowering cherry, peach and other trees from Japan.

TRADE MARK REG.

WURLITZER

THE WORLDS LARGEST MUSIC HOUSE



200 Years Ago in the little Saxon town of Shoeneck lived Hans Adam Wurlitzer, Master Violin Maker. His shop was a gathering place for musicians of the time, for he was a true craftsman.

When he died his shop passed into the hands of his eldest son, and for seven generations, down to the present day, the descendants of Hans Adam Wurlitzer have carried on his work.

In every Wurlitzer instrument you will find a quality, a character, that could not come from mere excellence of manufacture. It is the heritage of these seven generations of music craftsmanship.

Try any Wurlitzer Instrument ***in your Own Home***

YOU may now have any Wurlitzer instrument for a week's free trial in your own home. Examine the instrument, show it to your friends, play it as much as you wish. No obligation to buy — no expense for the trial. We make this liberal offer because we want you to try for yourself these wonderful instruments, the result of 200 years' experience in musical instrument building.

Easy payments are arranged to suit your convenience.

This is your opportunity to try a famous Wurlitzer instrument in your own home.

Send for

New Catalog

The greatest musical catalog ever published! Over 3,000 articles—every known instrument described and illustrated; many of them shown in full colors. Gives you lowest prices and all details of Free Trial, Easy Payment plan. All sent FREE—no obligation.

Send this Coupon

THE RUDOLPH WURLITZER CO., Dept. 1456

120 W. 42nd St., New York 117 E. 4th St., Cincinnati

329 S. Wabash Ave., Chicago 250 Stockton St., San Francisco

Send me, absolutely free, your new illustrated catalog, with prices and description of every known musical instrument. Also tell me how I may try any instrument in my own home and pay for it in small monthly sums. No obligation.

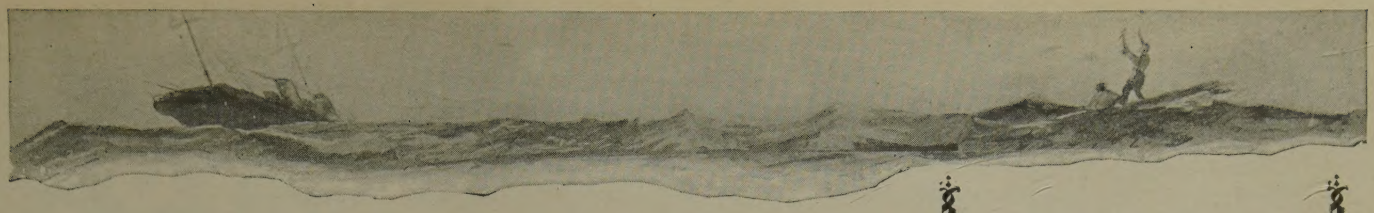
*Name*_____

*Address*_____

*City*_____ *State*_____

*Instrument*_____

(*State Instrument in which you are interested*)



They recommend that you read Joseph Conrad!

With such testimony before you, think what you must be missing if you are not familiar with this great novelist, whose works, says Sir Hugh Clifford, "have no counterpart in the entire range of English literature."

WHAT a life was that of Conrad! Once, a little boy in Poland, he put his finger on a map and said, "I shall go there." He had pointed to the Congo, in deepest Africa. In later years he did go there, and if you wish to know what he experienced, read *Heart of Darkness*, "the greatest piece of descriptive writing," says Ellen Glasgow, "in modern English prose."

He had an unaccountable longing for the sea, this sensitive lad, child of an inland race. So, still in his teens, he made his way to Marseilles and shipped as a cabin boy on a sailing vessel. For twenty years thereafter the open sea was his home. He did not even speak English until he was past twenty. He did not write a story until he was almost forty.

Then, settling down in a quiet corner of Kent, in England—recalling the rare experience he had been through and the motley array of men and women he had met up and down the seven seas—there came from him, one after the other, those unforgettable novels.

Before his death, he found himself acclaimed by fellow-craftsmen as the greatest of them all. His original manuscripts, sold at auction, brought the incredible sum of $110,998. A limited autographed edition of his work, 735 sets, sold to collectors for a total sum of over $129,000. No such tributes as these had ever been paid to an author while he was still alive.

What is the secret of this unexampled enthusiasm, this adoration, in which Conrad is held? Above all his secret lies in the wondrous narratives he had to tell. No one could ever tell a story like Conrad, and no one has ever had such tales to tell.

THE INCLUSIVE EDITION OF JOSEPH CONRAD

—at a saving of $140.75 over the limited autographed Sun Dial Edition

The new Inclusive Edition *is printed from the same style and size of type as the famous Sun Dial Edition* which was autographed by Conrad, and sold for $175.75 a set.

Moreover, it contains the same fascinating special prefaces by Conrad—telling how he came to write each one of these memorable works.

It is a splendid set of books in every respect. But instead of selling for $175.75 cash, like the autographed Sun Dial Edition, the price is only $35.00 and even this sum may be paid in convenient monthly amounts, if desired.

For those who want to own Conrad complete—and what intelligent lover of books does not—this is the most desirable opportunity ever presented.

The complete set—twenty-four volumes—will be sent to anyone interested for free examination. The publishers advise immediate acceptance of this offer, for at the special popular price this edition is fast disappearing If interested, mail the coupon below.

DOUBLEDAY PAGE & COMPANY
Dept. C-599 Garden City New York

Those who haven't read Conrad are not well read. Those who don't intend to read him are of a foolish and slovenly mental habit. As for those who are engaged in reading him—for the first time—how I envy him!

Gouverneur Morris.

The only writing of the last twelve years that will enrich the English language to any extent.

John Galsworthy.

Here, surely, if ever, is genius—the possession by a divine spirit of man's earthly clay.

Hugh Walpole.

One comes to Conrad with unspeakable relief—with the feeling that here, at last, is a novelist who understands as the poets do.

Christopher Morley.

One of my chief claims to distinction in the world is that I wrote the first long appreciative review of Joseph Conrad's work.

H. G. Wells.

There is no one like him; there is no one remotely like him. He sees and describes not merely this man's love or that woman's inspiration, but the blind sweep and devastation of universal forces.

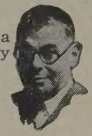
H. L. Mencken.

To stand in a Summer stifled, man-smelling city street and to feel suddenly a fresh salt wind from the far-off pastures of the sea—this is the sensation when one comes upon a book by Joseph Conrad.

Mary Austin.

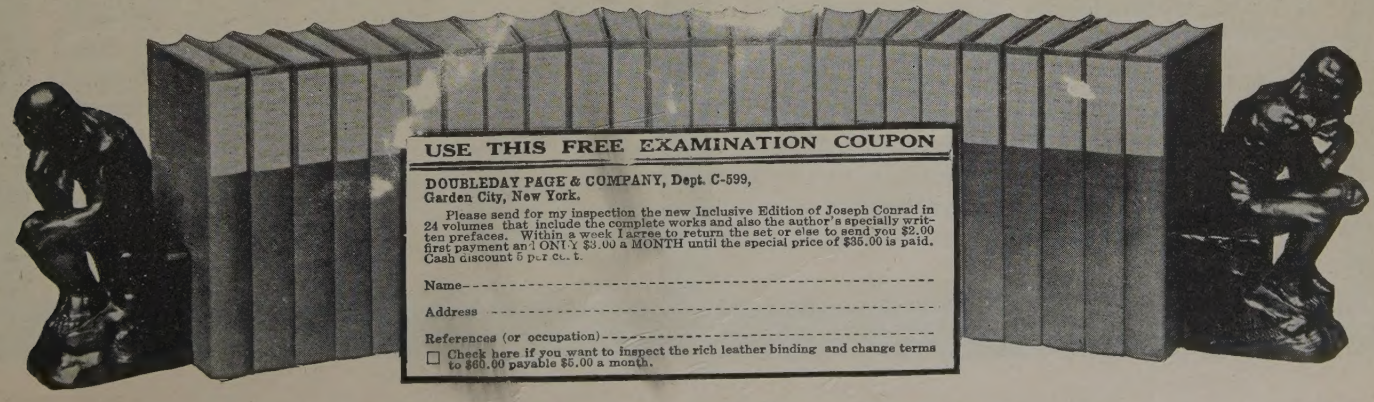
I know of no contemporary author who can build a scene before the eye as vividly as Conrad, or who can push a character through the door and leave him to speak for himself as Conrad does.

Meredith Nicholson.



In all his novels there is a harmony of tone absolutely orchestral in effect.

Joseph Hergesheimer.



USE THIS FREE EXAMINATION COUPON

DOUBLEDAY PAGE & COMPANY, Dept. C-599, Garden City, New York.

Please send for my inspection the new Inclusive Edition of Joseph Conrad in 24 volumes that include the complete works and also the author's specially written prefaces. Within a week I agree to return the set or else to send you $2.00 first payment and ONLY $3.00 a MONTH until the special price of $35.00 is paid. Cash discount 5 per cent.

Name----------

Address----------

References (or occupation)----------

☐ Check here if you want to inspect the rich leather binding and change terms to $60.00 payable $5.00 a month.

Organized to stimulate public interest in every phase of Nature and the Out of Doors, and devoted to the practical conservation of the great Natural Resources of America.

Board of Trustees

CHARLES LATHROP PACK
President

PERCIVAL SHELDON RIDSDALE
Treasurer

ARTHUR NEWTON PACK
Secretary

Associates

E. LAURENCE PALMER
Director, Nature Education

ANNA BOTSFORD COMSTOCK
Nature Study Review

WILLIAM L. FINLEY
Naturalist and Lecturer

DR. T. GILBERT PEARSON, Pres.
National Association Audubon Societies

R. BRUCE HORSFALL
Nature Artist

GUY C. CALDWELL
Naturalist and Lecturer

RUSSELL T. EDWARDS, Director, Educational Section

The American Nature Association seeks to find for Nature Study an essential place in every school and in every American Home. It is working for Forest and Wild Life Protection along sane economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship.

YOU ARE INVITED TO SEND YOUR NAME AND ADDRESS WITH $3.00 FOR MEMBERSHIP IN THE ASSOCIATION, INCLUDING NATURE MAGAZINE FOR ONE YEAR
SUSTAINING MEMBERSHIP, $25.00 PER YEAR. LIFE MEMBERSHIP, $100.00

AMERICAN NATURE ASSOCIATION,
1214 Sixteenth St. N.W.,
Washington, D. C.

I desire membership in the American Nature Association, including NATURE MAGAZINE each month, and such bulletins and information as are given to members. I will remit $3.00 for one year's dues upon receipt of your bill.

90% of the annual dues is designated for subscription to the magazine

Name.....

Street.....

City.....

September

AMERICAN NATURE ASSOCIATION,
1214 Sixteenth St. N.W.,
Washington, D. C.

I enclose $3.00 for membership in the American Nature Association for one year, including NATURE MAGAZINE each month, and such bulletins and information as are given to members.

90% of the annual dues is designated for subscription to the magazine

Name.....

Street.....

City.....

September

Nature Calendar

SEPTEMBER

The End of Summer

"When poppies in the garden bleed,
And coreopsis goes to seed,
And pansies, blossoming past their prime,
Grow small and smaller all the time,
When on the mown field, shrunk and dry,
Brown dock and purple thistle lie,
And smoke from forest fires at noon
Can make the sun appear the moon,
When apple seeds, all white before,
Begin to darken in the core,
I know that summer, scarcely here,
Is gone until another year."

—*Edna St. Vincent Millay.*

The first light touches of autumn colorings now tint fields and woodlands.

Some Sumacs already have turned a bright scarlet.

The leaves of the Sour Gum or Tupelo tree also change early to shades of scarlet tinged with orange.

The cottony covering on the leaves and stem of Pearly Everlasting prevents the evaporation of moisture and so preserves the plant for some time.

The burs of the Beech are scattering their kernels on the ground.

You may find the yellow button-like flowers of the Tansy blooming by the waysides.

Closed or Bottle Gentians of deep violet-blue are now in bloom.

False Spikenard, with clusters of ruby-red fruit at the end of the stalk, is common in the woods.

This is aster time. The New England Aster with its purple petals and golden center may be distinguished by its leaf which clasps the stem by a broad base.

The berry clusters of the Mountain Ash are turning a bright crimson.

Wild Grapes are ripe. Many little creatures of the open enjoy a meal of them.

Mushroom season is in its prime. There is much interest and pleasure for you in a mushroom hunt in woods and pastures where beautiful colors, interesting forms, and—for those who know the edible species—a delicious meal awaits you.

Now the Common Tree Frog disappears for his long winter's nap in some snug spot among the roots or hollow trunk of a tree.

You may find some Giant Puffballs growing conspicuously in the grassy meadow.

As you near the edge of a wood you may chance upon some Russulas. They range in color from bright clear red to purple.

Here too the beautiful Coral Mushroom (Clavaria), many-branched and delicately tinted, may be growing.

Large clusters of Beefsteak Mushrooms are often found on decaying chestnut logs.

Among fallen leaves, brown Toadstools huddle in compact groups.

Do not pick that tall white mushroom having a stalk with a swollen base and a cup-like or scaly envelope. It probably is the "Destroying Angel" or "Death Cup" (*Amanita phalloides*), a very poisonous species.

Cultivated lawns as well as open pastures are good places to find the Common Field Mushroom (*Agaricus campestris*).

Many of our insect-eating birds such as the Orioles, Vireos, Flycatchers, Kingbirds, Yellow Warblers, Purple Martins, and Veeries, are now southward bound.

Large flocks of Blackbirds comb the stubble of the one-time grain fields for ungathered kernels.

By the end of the month Muskrat houses will be well thatched and ready for winter occupancy.

Near woodland streams, in tangled upland thickets, Woodcocks are gathering for their migration. Soon their newly grown feathers will be fully developed for their journey.

Prepared for NATURE MAGAZINE by the Cleveland Museum of Natural History

CUTIE, THE PRAIRIE DOG, SITS FOR HIS PORTRAIT

Nature Magazine

Vol. VI SEPTEMBER, 1925 No. 3

"Fain would I stretch me by the highwayside
To thaw and trickle in the melting snow;
That mingled, soul and body, with the tide,
I, too, may through the pores of Nature flow."
—THOREAU.

Cutie, a Prairie Pet

By LORENE SQUIRE

(PHOTOGRAPHS BY THE AUTHOR)

"JUST come and see what your prairie dog has ruined now!"

For the ninety-ninth time that day I heard that wail. In resignation I laid down my book and went to see my pet's latest ravages. The edge of mother's fur coat was one mass of holes. How could an animal with only four needle-like teeth do so much damage, and why did he always choose to ruin the most valuable things in the house?

There he was sticking his head out from under the piano, his impish brown eyes fairly dancing with mischief. He had probably found his way in through a partly open door leading to the back porch or garden, where he is supposed to stay. Then he began his work of destruction. The coat was not all. The edge of a curtain was in ribbons and pages of a magazine torn in tiny pieces. Would Cutie, for that is his name, ever learn to behave?

Then again for the ninety-ninth time that day, I heard a long recital of Cutie's lack of usefulness. The family had been imposed upon long enough! Cutie will be chloroformed then and there. But he wasn't.

Cutie's eyes snapped and his short skinny tail jerked up and down. He sat up in the middle of the floor, folded his paws across his stomach and looked up at us innocently. So adorably cute, one could not punish him. He began tugging at my shoe string. His dark brown eyes danced. One simply had to like him, but he did not belong to a house and civilization, as the family would inform you.

HE WOULD SIT UP AND EAT LIKE A SQUIRREL

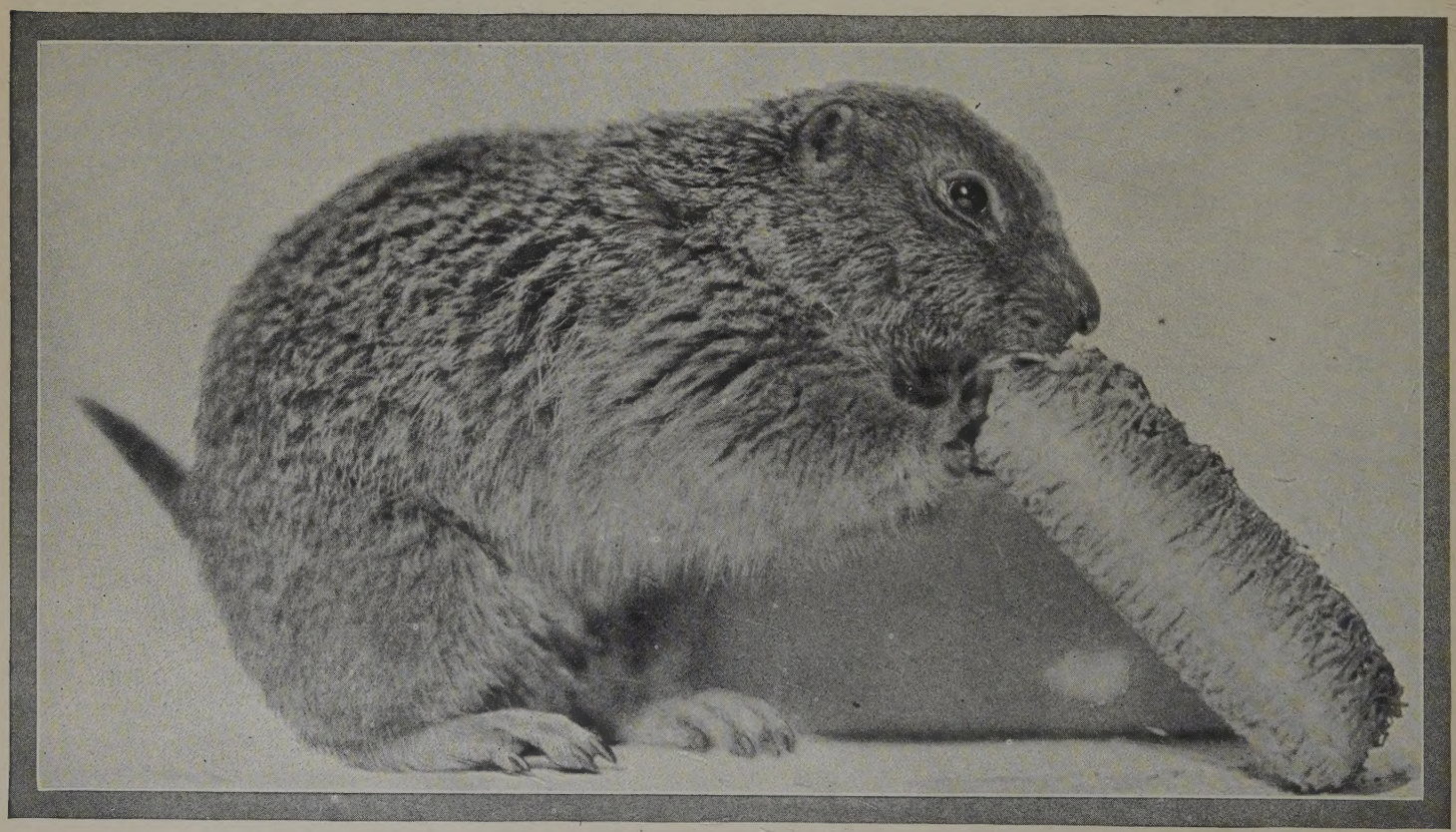
Somewhere on the plains he should have been sitting on a mound near his burrow barking to the winds and tearing up the world to his heart's content. All around him should be his friends of the prairie dog town, where little brown bodies travel here and there, following well-beaten paths while others are foraging on the buffalo grass. Far

overhead a hawk. An old, old prairie dog, fat and experienced from his life of many summers would give the signal, and all the citizens bound into their burrows. Thus Cutie would have his excitement, his friends and his home or—a hawk's talons might sometime clutch him before he reached his burrow.

Cutie looks very much like the rusty fox squirrel, though his fur is a more yellowish-brown and his tail is far from long and fluffy. He is more fat and round and does not walk in long graceful bounds. Instead, he waddles about in a leisurely manner when there is nothing to hurry him. However, he can go at fairly high speed when he takes a notion. His head is much like the squirrel's though his ears are shorter. Eating, he sits up and uses his paws to hold things exactly as does the squirrel. His favorite food is English walnuts when opened for him.

"ONE SIMPLY HAD TO LIKE HIM"

Of course, the wild habits of the prairie dog and squirrel are entirely different. They are both rodents, great gnaw-



CUTIE BUSY AT LUNCH ON A FAVORITE BREAKFAST FOOD

THE PRAIRIE DOG IN AN AQUATIC POSE

ers as a group. Few, it seems, however, could get so much pleasure from gnawing for no special reason as the prairie dog. Of all prairie dogs none could be so thorough and persistent in the art as Cutie.

Adopting any wild animal must have certain inconveniences, but when one selects a prairie dog with habits like Cutie's he should start borrowing money to pay for property damaged.

Prairie dogs are numerous on our Kansas plains, though their numbers are constantly being lessened by poison put out by farmers who wish to cultivate the land taken up by the prairie dog towns.

I first saw Cutie in a cage. His individuality stood out at once. When I approached the cage all the other ones rushed to their holes except Cutie. He stood up very straight and looked at me. I offered him a green apple from a nearby tree. He took it and set to work. I fed him oats and he took them grain by grain from my hand. He held each one daintily in his paws, then placed it in his mouth. After chewing a while he took the husk out with one paw and ate the kernel, meditating thoughtfully.

Cutie had a big bump of curiosity. It would likely have cost him his life on the prairie for he would have come out of his burrow to get a good look at a passing coyote or hawk. He had, I found, investigated rats, dueling frequently with the result —one dead rat and a scratched and very happy prairie dog. His nose and jaws were scarred by battle. He won me from the start and I took him home in a wooden box.

Cutie, I was warned, would try to gnaw through the top of the box or cage in which I was going to keep him. A prairie dog never gnaws sideways or down. Also, I was told, he would eat practically anything and thrive on it, for his was a "tough constitution."

The family accepted the prairie dog in martyred resignation. He was installed on the back porch. Two ice-box shelves were robbed from the kitchen as a strong top for his box, violent protests from the cook, notwithstanding. The box was filled with good clean hay and an old coat for Cutie to sleep on. He showed his appreciation by burrowing through the hay and rolling himself in a little ball

at one corner of this new home in civilization.

This was all right for sleeping, but during the day he craved space. He worked until he loosened one of the ice-box shelves that barred him from freedom. Cutie soon learned many things. He could open a door which was unlatched by sticking his paw in the crack and pulling. When he wanted a drink he would go to the sink and stand straight up until someone came and gave him one. He learned his name and would come when called if he wanted to.

There was one thing the family came near to appreciating about Cutie. That was his bark. It was the cutest thing about him. He would sit up, fold his paws over his stomach and then bark. As he did it he jerked his tail up and down and made a funny little bow—clear to the floor, and then back again, like one of those dolls who cry "mamma."

The bark sounded something like the bark of a dog although it would never be mistaken for that. It did not seem to express any emotion. I have never known him to bark in defiance, anger, friendliness, or desire of anything. Prairie dogs may bark from fright, but as I have never seen Cutie show any signs of fear I do not know. Sometimes he barked when glad or excited but it did not seem to express either of those things. Very often he barked when eating. There was one thing sure to make him bark, no matter where he was or what he was doing—the telephone bell.

When something did not exactly suit Cutie he squealed and chattered in a way impossible to describe. When really angry and ready to bite someone his teeth chattered and the hairs on his skinny little tail stuck straight out expressively.

Among his exploits Cutie has chased a collie dog all over the garden, a cat clear across the neighborhood and scared the biggest dog in town. The last, a very great coward despite his size, ran two or three blocks yowling all the while. He was a new animal in their lives, and when he ran at them it surprised even more than it frightened them. The collie preferred to keep away from such a little bundle of fury than depart from his dignity in attacking it. The cat had stalked Cutie as if he were a bird and when she was ready to make her final leap, he jumped instead, and bit her leg. It nearly scared poor pussy out of her nine lives.

"I HAVE NEVER SEEN CUTIE SAD OR DEPRESSED"

One day I found Cutie playing with a neighbor's pup fox terrier. He was having the time of his life and seemed to like the pup immensely. They romped and chased each other back and forth across the lawn. When I took my prairie pet home he objected very strenuously.

Cutie paid about as much attention to scoldings and punishments as he did to the wind. When he was chewing on a magazine or doing something he should not it did no good to shout at him or slap him. The only thing that would make him stop was to remove him from what he was destroying and shut him up.

I have never seen Cutie sad or depressed. He was always so busy exploring or ruining something that he had no time to think about himself. He seemed to enjoy everything, even being scolded or punished. He never has shown any especial signs of affection with any of us, yet he liked human company. He would scratch at the door and squeal

"HE SEEMED TO ENJOY EVERYTHING, EVEN BEING SCOLDED OR PUNISHED"

and scold until he was let into the kitchen. If someone was on the back porch or outdoors and he was alone in the kitchen he would make a terrible fuss until somebody came and let him out.

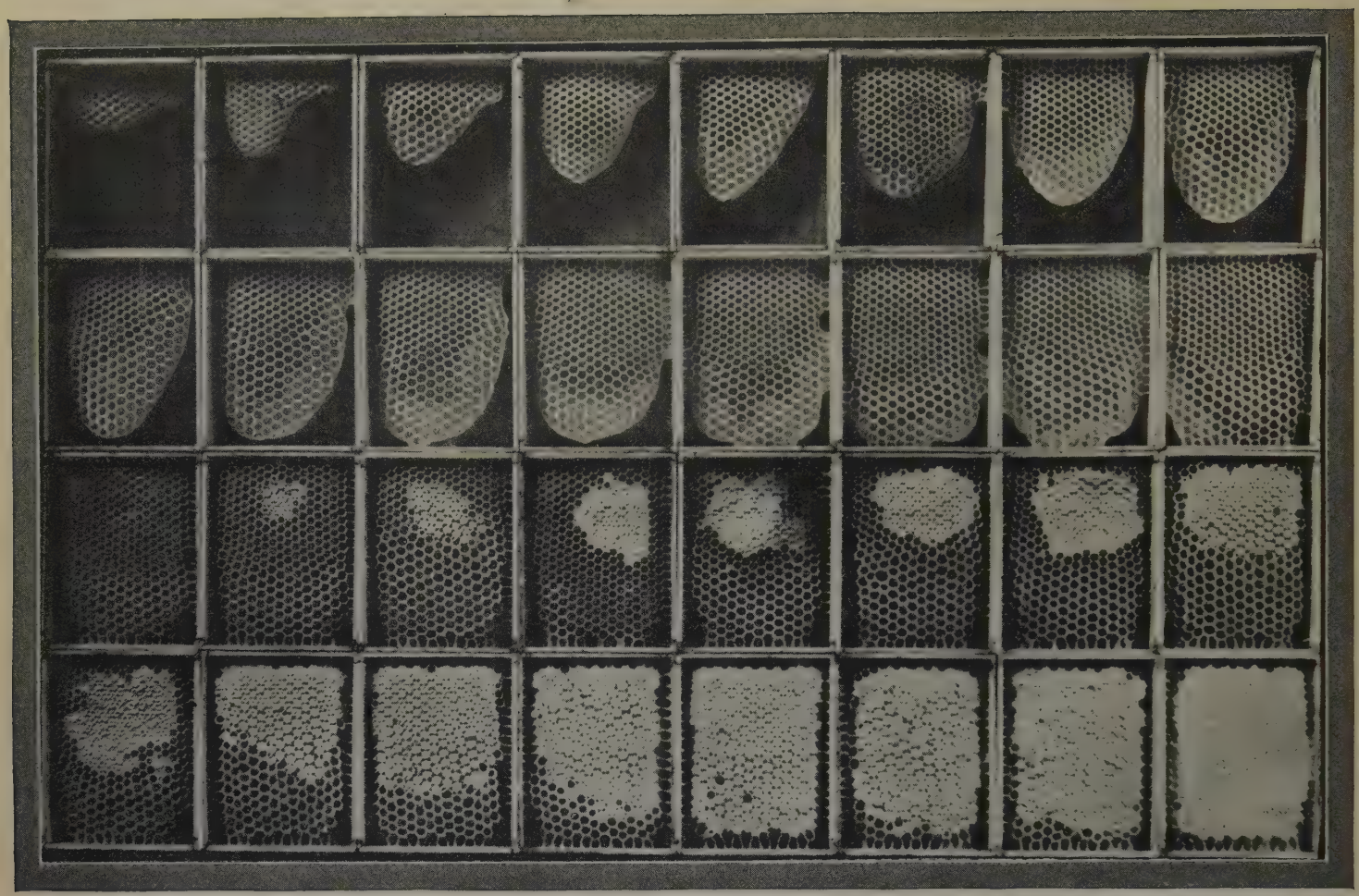
Prairie dogs are supposed to be specialists in making holes but that did not accomplish enough damage for Cutie's tastes. He preferred to spend his time gnawing. He started two holes on opposite sides of a big mulberry tree and if he had not quit digging because of some impassable roots the holes would finally have come together as they were exactly opposite. Cutie found pleasure in starting holes in precious flower beds and also in biting off the stems of the flowers.

As time went on protests against Cutie's destructiveness became more and more vociferous and frequent. The dog had the instinct or habit to gnaw everything within reach and try as we would we could not change or modify it.

One afternoon the prairie dog found his way into the house and began his ravages. When I returned from a hike across the prairies I was shown Cutie's various crimes. He could do much during five minutes but in one afternoon he had completely chewed and gnawed everything within his reach upstairs and down. The things he ruined would make a long list. Original, as always, he climbed under the slats of two beds and made big holes in the mattresses.

We found him on the back porch in the middle of the floor. He was asleep, but what a position. He was sitting up and in a complete, fat, little ball so that his nose almost touched the floor. His paws were folded across his stomach and he looked like a statue of an Indian Buddha—very wise and self-content. One would have thought he was meditating on a great problem. Dad leaned over and blew smoke at him. Cutie jumped a foot in the air, then bristled his tail and walked in all dignity to the box where he slept.

I often wondered what would happen if Cutie were brought back to a prairie dog town. Would it bring to light all the instincts and tendencies which had never before shown themselves and would he soon be acting like any normal prairie dog? Some day I am going to take him out to the prairie dog town, in the midst of the burrows. If he becomes one of them, begins a hole for himself and acts something as a normal prairie dog should he will stay where he belongs—on the prairies.



PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

THE EPIC OF THE HONEYCOMB

This photograph shows the story of the building of the honeycomb from the small start in the upper left-hand corner to the sweet-laden comb in the right-hand corner.

The Romance of Honey

By CATHERINE BEACH ELY

HONEY has romantic interest because of its remote historical uses, its suave aroma, its poetical suggestion of summer bloom. A crisp dripping honeycomb gratifies the artistic sense with its fragile amber and white texture. Strained honey suggests melted gold from the scented palms of an Olympian goddess.

What distinguishes honey esthetically as a Nature product is an individual flavor as rich as it is delicate, imparted by wild flowers and fragrant meadows. Honey is a poetical food, redolent with Nature's loveliest moods. It may owe its distinction to spicy mint plants, or to the subtle essences of blossoming orange trees; it may have a strong hearty flavor like buckwheat honey; it may suggest a dainty fairy banquet, like clover and alfalfa honey. It runs the gamut of nectarine delights which vary with the several seasons of the year.

Among the richest sources of honey are many odd and lovely flowers of familiar or exotic origin. Asparagus, aster, barberry, beans, catnip, clover, sweet-clover, cotton, crocus, currant, corn, dandelion, goldenrod, gooseberry, hawthorne, hepatica, hyacinth, mignonette, mustard, raspberry, sage, snapdragon, strawberry, teazle, thyme and violets are among the best known of the myriad honey-yielders. Bees like to visit the blossoms of many kinds of trees, such as basswood, eucalyptus, gum-trees, linden, logwood, maple, mahogany, peach, pear, apple, cherry, poplar, rosewood; and coconut, date and royal palms. In the desert and semi-desert sections of the west, alfalfa is the principal honey-producing plant, although cutting the plant before it blooms is now interfering with the honey yield. In California, mesquite, black sage and white sage, in Mexico, century plants, and in

Ontario and Quebec, thistles are generous honey-yielders. In climes northern, tropical and temperate, the questing bee hovers over delicate wildflowers, heavy-scented tropical bloom and lavishly blossoming trees. She gets her richest treasures from tiny inconspicuous flowers which the eye of man scarcely notices and some of her most luscious booty from thorny independent plants.

She works with a sure technique and an accurate aim according to one of Nature's deftest and best-known processes. We all know how the working-bee plunges her long tongue into the floral regions of plants and extracts a sweet gummy liquid that she swallows into her crop, where it is converted into honey, how she transports it to the hive and disgorges it into the cells of the comb waiting to receive it—cells made of wax secreted in the glands of the worker-bee. Here is Nature's simple program upon which is based a world industry.

A DUSTPANFUL AND AN ARMFUL

Above is shown the task of brushing off a gathering of bees. Below, Edward F. Bigelow is hugging an oak branch loaded with hundreds of his bees.

Honey is a syrup made up of about four-fifths sugar, one-fifth water, some dextrin, a little mineral matter, this compound delectably impregnated with small quantities of fragrant volatile oils and minute flavoring substances. It is a sort of cloverleaf of the sugars—sucrose, dextrose and levulose.

Uncle Sam produces the most and the best honey in the world, to the tune of over twenty million dollars a year. American apiculturists are carrying on their work with enthusiasm and irrepressible inventiveness, but apiculture should be given more attention in our Agricultural Colleges. Combining, as it does, Nature study, economic principles, and active outdoor life, it makes a fascinating vocation or avocation for professional men and women.

The colorful history of honey offers a panorama of the development of the human race, the picturesque food customs and commerce of ancient races, the progress of scientific invention and the establishment of modern industry. To the ancients who did not have cane-sugar, honey was a life-saver. It served them not only as a subject for poetry and metaphor, but as a necessary food. Primitive man scooped honey with his fingers out of hollows of trees and crevices of rocks, where bees had deposited it. Wild honey is still a finger-tip relish in parts of Africa, Asia, South and Central America. We are told that the Orient is so rich in honey that the tourist

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

A COLUMN OF BEES

Remarkable gathering of honeybees in an interesting formation on the branch of a tree.

sometimes sees large combs fat with golden syrup hanging from trees. In the early pioneer days of our country "bee-trees" were highly valued, and still give primitive satisfaction in remote rural sections.

Honey threw its golden glamour about pagan life and ceremonies, enriching their feasts and scenting their libations. In the days of ancient Egypt apiaries floated up and down the Nile. Beekeeping was a popular occupation in Babylon, Assyria, Palestine, Carthage, Greece and Rome. Poetic honey came from the mountains of turbulent hotly contested Sicily, and Grecian thyme honey from Mount Hymettus in Attica—land of caressing breezes and flaming sunsets. A missionary recently arrived in the United States from Greece brought with her two cans of Hymettus honey, which shows that the ancient brand has found its way into twentieth century markets.

In Bible days honey was a leading product in agriculture and commerce, and therefore a symbol of material and spiritual prosperity. Its sustaining and refreshing quality inspired Bible characters to songs of gratitude. Honey dripped from the songful lips of Virgil. Aristotle and other savants of ancient days lubricated their august brains with the subject. Modern authors dip their pens in

BUMBLEBEE AT WORK

The insect maker of the sweet honey busily engaged in pollinating the blossom of the apple tree.

honey. In "The Life of the Bee" Maurice Maeterlinck writes: "The bees give their honey and sweet-smelling wax to the man who attends them; but more precious still is their summoning him to the gladness of June, to the joy of the beautiful months, for events in which bees take part happen only when skies are pure, at the winsome hours of the year when flowers keep holiday." He adds that the flight of the bee is "the token of all the myriad fragile joys that are born in the heat and dwell in the sunshine." A writer in the Manchester *Guardian* tells us that a hive containing sixty pounds of honey concentrates the results of over 28,000,000 miles of flight. "One ceases to wonder," concludes the writer, "that the average life of a bee is only six or eight weeks, in which short time it wears out its tiny wings and exhausts its body."

The idea that beekeeping might be run as a scientific industry stirred the investigating mind of Jan Swamerdam, the Dutch naturalist, about the middle of the sixteenth century, and he contributed largely to establishing the bee on a scientific basis. Some wonderful experimenting with honeybees was done by Huber, a blind Swiss naturalist, with the aid of his wife: it is sometimes the physically handicapped man who brings the bacon home—or to symbolize by the subject in hand—who brings the honey home. By the invention of a movable frame-hive, a Philadelphia pastor, Lorenzo Lorraine Langstroth, in 1852 converted beekeeping from a fad to a national industry. This contrivance revolutionized honey production: it is often a single invention which unlocks the pent-up currents of progress. A. I. Root, a friend of Langstroth, and other experimenters, continued hive improvements.

American apiarian implements and methods of honey distribution are today the standards of the world. After finishing a course on beekeeping at the Massachusetts Agricultural College in Amherst, a student visited one of the leading United States honey companies, which specializes in packing and distributing honey and in queen-bee culture. The

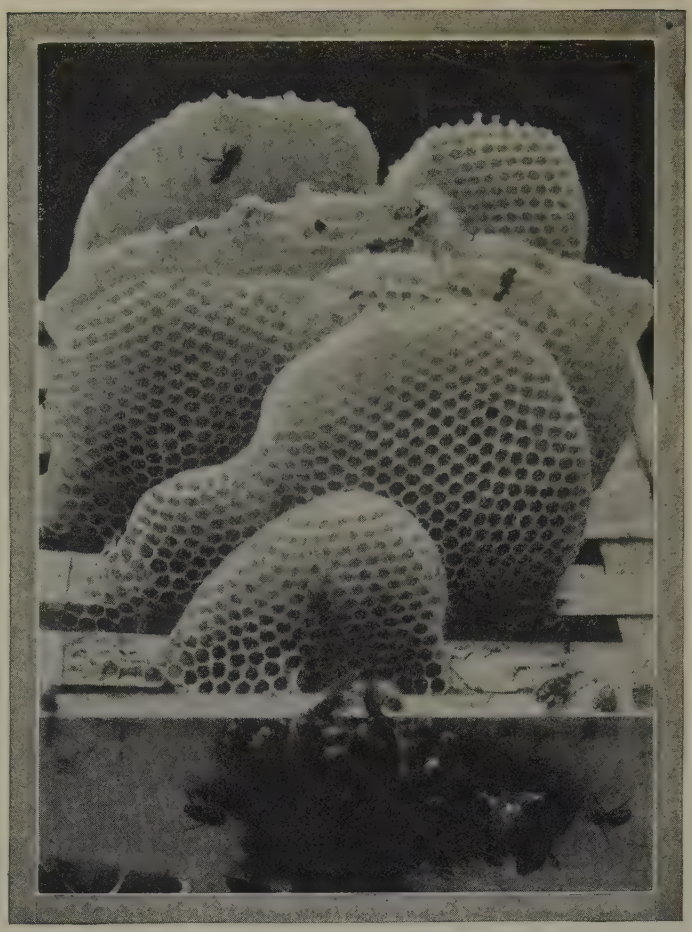
A LIMB WITH A SWEET BURDEN

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

Remarkable photograph showing a comb that ambitious honeybees built upon a limb of a tree. Small wonder the bee's life is short.

student saw how honey is handled commercially: a carload of honey was just leaving for Detroit. The company's heaviest honey crop was from the white clover of Wisconsin. Wax is one of the most valuable by-products of honey production. A room of the establishment was filled with wax molded into large cakes like cheese or in tubs like butter, ranging in color from palest amber to black. For individual use the company prepares tiny jugs of strained honey and little combs about an inch square, the honey having been adroitly cut from the original combs, placed in little frames and sealed: thus does human craftsmanship remodel the bees' product.

Honey has always symbolized abundance, golden prosperity, happy living. This decorative, luscious substance, produced by one of Nature's most interesting processes and developed by centuries of human effort, is worthy of our esthetic and scientific appreciation.



PHOTOGRAPH BY EDWARD F. BIGELOW

BUILT IN STRANGE WAYS

Interesting formations into which the bees have fashioned their sweet-honeyed mounds.

Finally a word from Edward F. Bigelow, of Sound Beach, Conn., who knows and loves bees. He says:

"It is the misuse of things that makes trouble in this world. It is belief in one's own ability and the poise and self-possession that come with it that we must inculcate as well as first-hand knowledge of these most wonderful insect workers. Honeybees, like people, are too often misunderstood when viewed from afar or known only from what has been written and printed about them. The tendency is to malign and misrepresent. Our impressions of people grow more favorable with first-hand acquaintance. Things are not so terrible as they seem. It is fear of things that detracts from the pleasure of life.

"When one gets to know the honeybees in intimate and loving acquaintance they are seen to be living their life in their own way, perfectly happy and contented in the pursuit of their daily occupations but ever ready to protect themselves against aggression."

Amateur Nature Photographers, Dust Off Your Lenses!

What interesting and novel stories of Nature have you preserved in film? What birds, animals, fish, or other subjects have you "shot" with your camera? Each month NATURE MAGAZINE will run an Amateur Photographer's Page. For the best photograph submitted we will award a year's membership in the American Nature Association, with NATURE MAGAZINE for one year. This will be for the successful contestant to use or give to a friend. Other outstanding pictures will be printed crediting authors.

The first photographs will be printed in the November number of NATURE MAGAZINE. They must be mailed to reach this office on or before the Fifteenth of September. Contestants wishing their photographs returned must send with them a stamped, self-addressed envelope. Photographs for the December contest must be in before the Fifteenth of October.

Mail your Nature photographs to Photograph Editor, NATURE MAGAZINE, 1214 Sixteenth Street N.W., Washington, D. C.

Notable Fishes of the Sea

By CAPTAIN J. MENANDER
Of the Explorers' Club

THERE are few studies more fascinating than deep-sea investigation. More than 70 per cent of the surface of the earth is composed of water, and down in these vast regions are many wondrous things. The greatest measured depth of the sea is 32,636 feet at a point 145 miles southeast of Tokio. The Nero Deep, southeast of Guam, is 31,600 feet, greater than the altitude of Mount Everest above the sea.

This tremendous kingdom of water, estimated at 319,000,000 cubic miles, is inhabited by approximately 13,000 species of fish, many of which live under peculiar conditions and consequently have been compelled to develop special adaptations useful in their struggle for existence. Thus Nature has forced some of her children of the finny tribe into shapes and habits deviating remarkably from the conventional ideas we have of the proper way for a fish to appear and to act.

Fish are distributed through all the seven seas. Many of them are quite stationary in their habitat, living their lives at or not far from the place of their birth, while others roam over vast territories or migrate periodically from one location to another. The reasons for these migrations are visits to breeding grounds, or the search for food, or for water of a suitable temperature with the changing seasons. The common eel thus migrates from fresh to salt water to spawn. Others like salmon, its close relative the smelt, shad, and salt-water lamprey spend the greater part of their lives in salt water and enter rivers and lakes only to deposit their eggs.

Some of these migrating fish, as for instance the smelt and the salmon, at some time in the past have been prevented from returning to salt water by the damming up of the outlets of lakes, where they were born, and in this way they have by Nature been forced to adjust themselves to spending their lives in fresh water, while the majority of their species remains migratory. Divisions of the smelt genus of our Atlantic coast are thus permanently living in various lakes, amongst others Lake Champlain; and the landlocked salmon inhabits some of the lakes of Maine, New Hampshire and Vermont.

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

THE PORCUPINE, OR GLOBE, FISH

It can alter itself from a normal cylinder to a globular form. It has jaws somewhat like a parrot's beak, and with them can crush coral to get at the polyps.

One species of fish has been brought up from its habitat, off Cape Verde Islands, from a depth of 19,800 feet below the surface. In all about 600 species of deep-sea fish are known from a depth of 6,000 feet or more, where they spend their lives in total darkness, and many of them are blind. This is in accordance with a law of Nature that any organ, which is of no further use to its owner, is gradually eliminated. To overcome the darkness some deep-sea fish have developed independent light-producing organs, which form brightly shining eye-like spots, situated sometimes in a line on the side of the body from head to tail. In others the head or perhaps the entire body shines like a lan-

PHOTOGRAPH N. Y. ZOOLOGICAL SOCIETY

TRUNK FISH—FREAK OF THE DEEP

Its body is in a hard, inflexible shell with openings for the fins. It might well be named tortoise fish for this reason.

tern, while in still another a bulb, emitting a phosphorescent light, is carried at the end of a long, waving antenna, extending from the top of the head. Still another has a lantern in the roof of its mouth.

The light of these photogenic organs is either produced by the organ itself, or it is caused by a luminous bacterium. In the first case a secretion, produced by a special gland, is oxidized or burned within the gland. The necessary free oxygen is supplied from the blood in the capillaries of the organ. In the second case the gland furnishes nourishment to the bacteria that live within the gland.

Other types of deep-sea fish have long, sharp teeth, placed in an enormous, gaping mouth, with which they can swallow fish, even larger than themselves. A deep-sea angler fish, only four inches long, has been brought up with a seven-and-half-inch long scopeloid fish in its stomach. When an unusually large victim is devoured, the stomach of the captor swells up like a bladder under the body, and the outlines of the prey can be seen through the distended tissues. The color of most species, living in the dark abysses of the sea, is black or dark brown, but white species, without any pigment in the skin, have been found.

The most remarkable of all fish, not to say of all animals, is perhaps a deep-sea angler, which has recently been brought up from the great depths off the coast of Iceland. The male of this species, which is about four inches long, forms part and parcel of his twelve times larger spouse, with his head permanently attached to the underside of the female in the vicinity of the vent. Very little as yet is known of this denizen of the deep. The diminutive male in his youth apparently develops a number of outgrowths on his head. These protuberances, which at first are adhesive and hence afford the initial grip, irritate the skin of the female, causing a wound, through which blood vessels enter into the body of the male and there permanently connect with his circulatory system. As the wound heals, the two individuals at the point of contact become permanently joined. The male thenceforward is entirely dependent on the female and is nourished much the same way as the embryo of a mammal. Since he has been deprived of voluntary movement from place to place, and been relieved from the necessity of eating, he has become a mere appendage, his only function being to fertilize the eggs.

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

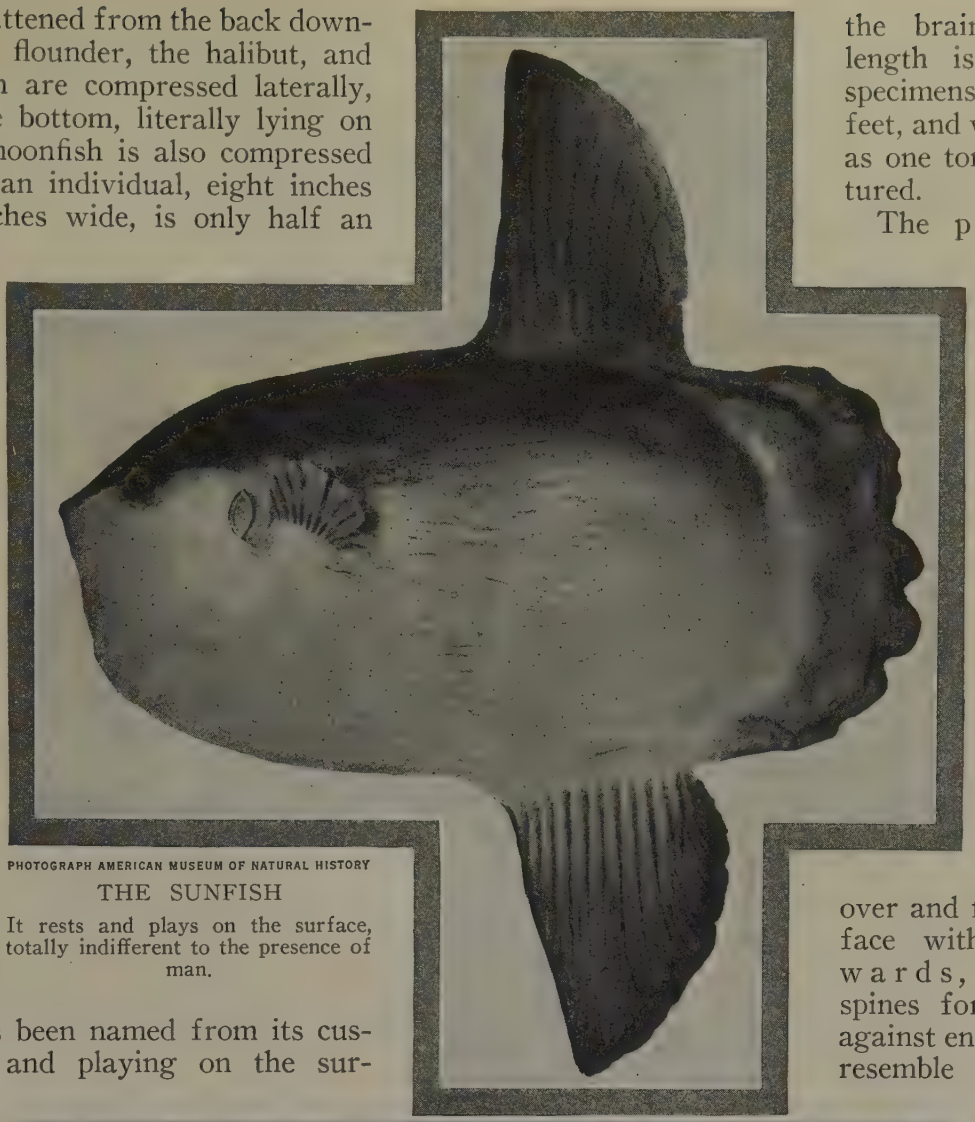
THE UNDERSIDE OF A MALE SKATE

Some fish, such as this, that live at the bottom of the sea, have developed flat bodies in conformity with their habitat.

Plant life disappears with the light, hence deep-sea fish feed either on each other or on the incessant rain of dead animals and plants from higher levels.

The shape of the typical fish is more or less that of a torpedo, the better to overcome the resistance when moving at a considerable speed through the element in which it lives. Some fish, living on the bottom of the sea, have developed a flat body. The

skates are thus flattened from the back downwards, while the flounder, the halibut, and other similar fish are compressed laterally, and swim on the bottom, literally lying on one side. The moonfish is also compressed laterally so that an individual, eight inches long and six inches wide, is only half an inch thick. This fish, which is common on our east coast is, however, not a bottom fish, but lives in midwater and swims in an upright position. Eels, on the other hand, are of a quite different form, being elongated and having the general shape of a snake.



PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

THE SUNFISH

It rests and plays on the surface, totally indifferent to the presence of man.

The ocean sunfish, inhabiting the open, temperate, and tropical seas, has been named from its custom of resting and playing on the surface in calm, sunny weather with its back fin protruding above the water. It is quite indifferent to the presence of man. Fishermen have been known to prod it with boat hooks and oars without greatly disturbing it. This fish looks as if it had left its tail behind; the body is in fact abbreviated to such an extent that the spinal cord is shorter than the brain. The usual length is four feet, but specimens as long as ten feet, and weighing as much as one ton, have been captured.

The porcupine fish, known also as globe fish, received this name from its ability to inflate its stomach with air, altering its normal short cylindrical shape to a globular form, and as its body is covered with spikes instead of scales, it much resembles a porcupine. When it is inflated, it turns over and floats on the surface with its belly upwards, the protruding spines forming an armor against enemies. The jaws resemble somewhat the beak of a parrot with the bones and the teeth of each jaw grown into one solid mass. By means of these strong jaws the fish is able to break off and crush pieces of coral to get at the nutritious polyps. The flesh of some of the species of this family is poisonous, apparently acquiring this quality from the food, which often consists of poisonous

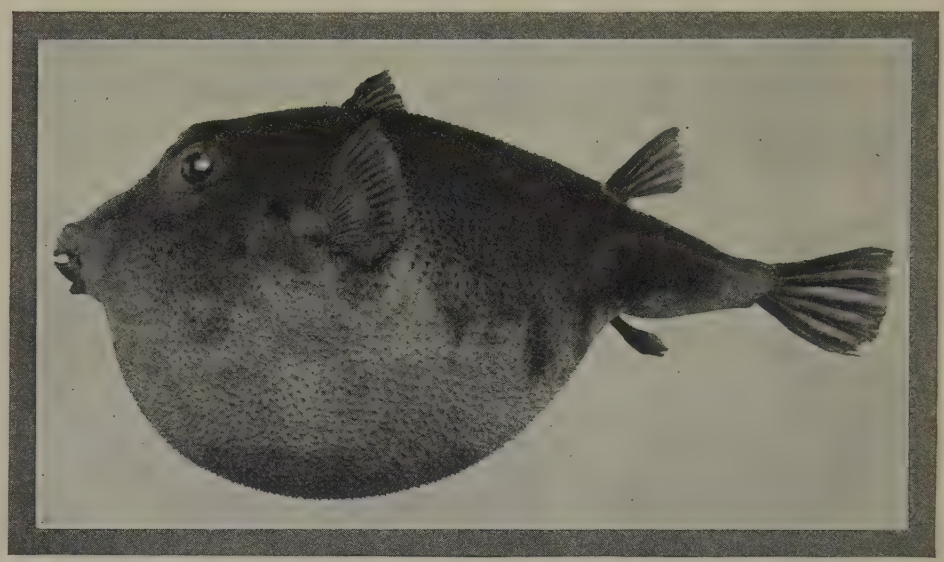
COWFISH PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

This odd denizen of the water also can inflate itself. Its name comes from the two horns on its head, which give to it a bovine appearance.

PHOTOGRAPH AMERICAN MUSEUM OF NATURAL HISTORY

PUFFER FISH

This fish has the ability to inflate itself. Above it is pictured normally and below blown up. One species is found on the Atlantic coast.



animals. It inhabits the Caribbean Sea, and reaches a length of three feet. Another kind of fish that can inflate itself is the puffer, which is smaller and smooth-skinned; one species of puffer is found on the Atlantic coast as far north as New York.

Another freakish-looking sea denizen is the trunk fish, which properly could be called the tortoise fish, since it has its whole body encased in a hard, absolutely inflexible shell with openings for the fins. When seen from the front, the body of some species of trunk fish is shaped like an equilateral triangle, the underside of the fish forming the small base of the triangle, while other species, living in the Indo-Pacific Ocean, are squarish. One species of this fish is called the cowfish on account of horn-like protuberances on top of its head.

The angler fish is a sluggish thing, which lives at the bottom of the seas of the northern and temperate zones, and is found on our side of the Atlantic as far north as Newfoundland. This fish, which reaches three to four feet in length, has an enormous head that tapers off to a small trunk and a diminutive tail. In some localities it has been given the name of "All-mouth," and anybody who has looked into its cavernous mouth, can readily see why. In spite of their gluttonous habits most species of anglers are too slow to chase and overtake the other fish on which they live. To catch its food, therefore, this fish selects some nook in the rocks, where it hides amongst seaweed and stones, or perhaps buries itself in the mud, with only its mouth and gill openings free, and there it lies in ambush for its prey. The animal, thus hidden, resembles its surroundings to a remarkable degree.

The enormous head of the angler with its protruding lower jaw looks like a rugged mass of rock with a natural ledge on its underside. On the lower margin of the fish, especially on the lower jaw, protrude lobular processes, which resemble the small sponges that fringe the lower edge of every conspicuous ledge. On the top of the head are placed waving antennae, which both in color and form resemble fronds of seaweed. To complete this extraordinary mimicry of the surroundings the prominent eyes of the angler are like the deserted shell of a barnacle. Thus disguised the angler need not resort to strategy to catch his prey. All it has to do is to lie close and quiet, with its tendrils lazily swaying back and forth in the passing current, like the weeds around, and unsuspecting individuals in the pursuit of their food will come right up to its very mouth. The angler is practically omnivorous.

Stomach contents of various individuals have been found to consist of many kinds of bottom fish, some nearly as large as their captor, of crabs, and even of mud rich in shell fish. About the end of the summer the angler seeks shallow water, where the female lays her eggs, embodied in a mucous film. This mass is found floating on the surface in a sheet from thirty to forty feet long, and three to four feet wide. After hatching the larvae remain at the surface of the sea, until in their transformation they have developed the characteristics of the full-grown angler, when they migrate to the habitat of their parents. The young matures in four to five years.

The Sentry of the Shallows

By BEN HUR LAMPMAN

(ILLUSTRATED BY A FULL-PAGE INSERT IN COLOR FROM A PAINTING BY R. BRUCE HORSFALL AND BY PHOTOGRAPHS BY WILLIAM L. FINLEY AND H. T. BOHLMAN)

GREAT BLUE HERON AEROPLANING

THE PATIENCE of Job is fixed in proverb, yet even he was not required to stand in chill water for a long hour waiting his dinner. Gray and motionless, sharply carved against the sheen of the pond, as silent as his own shadow, it is so that the great blue heron waits. He is patience epitomized, as he is the very spirit of the shallows.

Let him take his station where the saffron sand spit thrusts into the Columbia, give to the spacious river that slightly fretted surface which is so like the beauty of a damascened blade, order that the sunset shall fire the clouds above the dimness that is Lady Island, and the blue heron becomes the central figure of a Japanese print. Yet I think I like him best in his setting of cottonwoods, at morning, when the patches of meadow are bright with dew, and his pond breathes a faint vapor to the returning day. The lean old pagan, rigid beyond the rushes—why, Pan himself could ask no more of such a picture.

It is shattered. Flashingly the slim head strikes, and the sharp beak has found its target—the golden carp that swam too near the margin, the fingerling bass that saw no more than a drab snag rising from the lake, or the mottled frog that lifted his solemn visage in that perilous water. This is the toll the heron takes. And he drifts out of the setting, at sight of you, as grayly as the mist itself, as silently. The cottonwoods are weaving to the river wind. The mists are gone. And here in the sediment is pressed the spoor of the heron, the sentry of the shallows.

The yellow eyes of the heron, that have spied out so many fishes in their time, are not as the eyes of other birds; they are set somewhat beneath, on the sloping sides of the head, so that without muscular effort the fisherman stares at his feet, as fixedly as a bashful boy in company. No least movement is needed to focus the heron's eyes upon that space of water which, soon or late, must afford him his target and yield him his dinner. Such is the efficiency of Nature, yet I cannot but believe that many a heron, in the days when the nobles went hawking, must have wished—as his doom was upon him—for such vision as would scan the sky.

AT REST AT HIS NEST

The Great Blue Heron is the largest of truly American herons. It builds a large and bulky nest in tall trees along river banks.

Of old he was an honorable bird, this heron of ours, and when contradictory man would confer honor upon any wild creature he does so by making it his quarry, and by pursuing it until its body is his trophy. The heron was the proudest game any falcon might bring

A NEARLY GROWN BIRD

A stately and dignified bird who has been made wary by much hunting by man, who cannot boast of his treatment.

down; he was the quarry of royalty. What a brilliant company they were, those lords and ladies, riding out to the fields which marked the passage of the herons from their wood to the river. Little bells of silver on the bridles of the palfreys, scarlet doublet, riding habit of forest green, the brightness of a scabbard, laughter and badinage—with the country folk doffing caps to them. Hooded peregrines perched on their wrists, moody birds, waiting with eagerness the toss that should send them circling upward. Upward and upward, in perfect spirals, until death hovered above the laboring heron, and rushed downward to the kill. Kublai Khan, so they say—or it may have been another—hawked at deer with eagles. At least his servants carried flesh back to the palace kitchens. These nobles of Europe called the heron "game" but they left him for carrion. Let us trust that the proud, cruel pastime of falconry never will be revived.

Perhaps you are going to say, as you read, this watcher of the shallows takes many a fish that, suffered to live, might in time be taken by us. Granted, although the logic is somewhat queer, somewhat self-centered, somewhat heronesque. Yet so nicely adjusted are the balances of Nature that the heron may have more to do with our comfort than we dream of, and in most unsuspected ways. For there is no lack of evidence, of most regrettable evidence, that to disturb Nature's system of checks and balances is to invite sure penalties. As to what the great blue heron may be valued for, aside from his esthetic worth as an etching, a print, a picture framed beside still waters, one does not attempt to say. And yet—

They dike the rivers of the south with great levees, to restrain the seasonal floods, that vast tracts of rich bottom land may be plowed and sown and harvested. It might have seemed to fanciful folk, seeing the heron limned against these levees, so erect and vigilant, that the big blue birds were sentries stationed to guard against attack by water. But few are fanciful and fancies are the stuff of dreams—while a rising heron must create an itching in the trigger finger. Laboring upward on undulant wings, with one hoarse cry of alarm, what a target it is. Now! Crumple him! Well, in certain districts, the rivermen, the duck hunters, the small boys with their muzzle-loaders, killed many herons in this manner, for it was great sport. A heron was just a "crane," anyhow, and fit for nothing save wasted shot. In time the tall blue sentinels of the levees grew scarce, and scarcer yet, and when they were but few the rivers pressed against the dikes with ponderous insistence, the packed earth crumbled, and spite of sand bags and valor the yellow water roared house-high across the countryside.

The natives, the heron killers, confessed that it had them "beat"; that they didn't understand why the levees broke before a lesser stage of the river than many they could remember. It seemed a curious freak of malice for any trusted levee so to betray them. And they chewed much tobacco in that memorable discussion, without once chancing upon the truth. And the truth was, as certain outlanders discovered, that when the herons were scarce the crawfish multiplied, and when the crawfish had multiplied sufficiently their combined tunnelings of the levees so weakened those strong barriers that the river had its way with the land. And the herons were sentries, after all, and it had been a great mistake to crumple them up—a great mistake because it proved to be a costly one. Sometimes

the poet, making phrases, hits upon the truth more closely than the pedant.

Often among the cottonwoods along the river I startle the great blue herons from their perches, on the topmost branches, where they command a view of all the country round about. Why they should so dispose themselves I cannot say, unless they are as fond of that panorama of blue river and emerald wood as other fishermen. The heronries, of course, where the tall, plumed herons gather for the nesting, are high among their chosen trees—but the cottonwoods hold no heaped masses of gray sticks. One can but conclude that it pleases them to spend a quiet quarter hour up there in the wind and sun, like a midshipman drowsing at the masthead.

When the June freshet, taking toll of a thousand affluents, floods the meadows of the river bottom, the fish come in to spawn—calico bass and crappie, big-mouth bass and carp, sucker and chub. The vast, warm lake along the river is their chosen nursery. But as swiftly as it rises, so the flood falls, leaving millions of infant fish trapped in shallow ponds, that dwindle to the sun. And many creatures fish for them along the margin, or wade the shallow pools—for the misfortune of the infants is the opportunity of furred and feathered fishermen. It is the season of plenty for the great blue heron, who has no need to stalk a dinner, or to stand in wait. And, if you choose so to regard it, his mission is an urgent one. He is death in merciful guise, gleaning that which otherwise must die lingeringly. In August the last pool is only a dampness in the creviced clay, tracked with the spraddled feet of herons.

The wariness of the great blue heron was learned in a cruel school. If ever they were curious to know more of us, long since we taught them prudence, as we have taught prudence to so many birds and beasts. Yet once, as I fished a woodland lake beside the river, four herons came winging low over a lane of meadow and out across the water. It is probable these were young birds, with their lesson yet to learn, for the fact is that on seeing the fisherman they did not sheer away, but curved their course toward me and passed within casting distance—staring with evident curiosity, and, I would swear it, actually slackening their flight to observe the biped on the bank. Of a thousand herons I have seen, when in that favorite country of theirs, these alone seemed free from the common fear.

And here is an odd story of the great blue heron, that often I have puzzled over, without discovering an answer. It was in northern North Dakota that the incident occurred, and there were few of the birds to be found in that particular region—and these only in passage. Night herons were plentiful, and might be flushed from any slough, but the

YOUNG GREAT BLUE HERON

The young birds are a general brownish-slate color above and ashy below. There is no crest or long head feathers.

plumed pride of the family doubtless held his course until he came to woodland rivers and better fishing than newts. This one I found in the red plush parlor of a Bohemian farmer's home, tarrying there until moth and time should corrupt the perfect beauty of his bridal plumage. It was my first great blue heron, and I paid him tribute.

And as we supped on meat and cabbage, and diced dough, fried until it bounced, and a thick gravy blackened with currants, and tea that must have scored the heavy crockery cups, my host begged heaven to deal severely with a certain hired man. For, said he, it must be evident to any save a numskull that such a bird was not meant for death before its time; and, moreover, he felt he might have tamed it. My heart went out to him, and I turned to look again at the heron, gleaming stiffly in the red plush parlor, still dignified in taxidermist posturing.

GREAT BLUE HERON, FULLY GROWN

Its forehead and top of head are white and the sides of the crown and crest are black. The neck is pale gray and the throat marked by white, rusty and black streaks.

He said that he had gone to town, his wife with him, quite confident that the hired man could not harm the quarter section of wheat land, and, indeed, even hopeful that when he returned he might find the chores done. Vain optimism. Scarcely had he driven from sight when this strange bird, this fellow in the parlor, had come wandering in from the south, flying low over the young wheat. And then, mister, what do you suppose? I give you many a guess. You cannot? All in a splendor of plumes and stiff dignity the great blue heron dropped into his very barnyard, among the geese and chickens, and stalked idly about as though it suited him well. But that numskull, that certain hired man—oh, heaven would see to him!—had gaped but a moment at the miracle before he ran for the shotgun, which stood in the kitchen corner, loaded for duck. No, the heron had not seemed afraid. It had watched the hired man as he lumbered toward it. The bird had not taken flight. And when the black powder smoke drifted aside, there it was, quite dead among the geese and chickens, and they scattering with justified alarm. Quite dead. Now such a thing as this, as any save a numskull would know, could not possibly happen again in a man's lifetime. He rose and walked into the parlor, to run a calloused hand over crest and back, where the plumes lay long and soft and silken. Not again in a man's lifetime.

What of this heron that was not afraid? I am sure I cannot tell you. The answer is hidden. Individualism is as marked among birds as among men, if our dull eyes could see the evidence. And now and then some wild creature does not conform to the inherent fears or prejudices of his kind, but stands out from the flock or the pack or the herd, individual, different, strangely personalized. Perhaps this heron was such a one. But I have liked to think, at times, that somewhere he had found friends among us, who taught him friendship. And I have put the thought aside, for to entertain it is to speculate upon another betrayal. For is not life like this with man yet far to go before he really knows his true friends?

An Albino Robin

YES, IT is a robin and a resident of Lake City, Minnesota. Mother robin built her nest on the porch of a house and laid three apparently orthodox eggs. From them hatched three robins, writes R. Forest McConnell, the other two being perfectly normal in every respect, but the one in the photograph being quite white with pink eyes. Now well grown, this snowy

member of the robin brood is very tame.

Albinism is common in birds and animals. This bird has brought, however, considerable distinction to Lake City, and has stood by its home town and is still found about two blocks from where it was hatched. So tame is the bird that A. C. Fitschen had no difficulty in getting him to pose very quietly for this picture.

THE RING-TAILED IGUANA SUNNING HIMSELF

This is one of the most abundant reptiles found on the Isthmus and is capable of much speed, waiting for the observer to come upon him and then darting away.

Some Reptiles of Panama

By R. N. DAVIS

Director, Everhart Museum, Scranton, Pa.

(PHOTOGRAPHS BY COURTESY OF THE NEW YORK ZOOLOGICAL SOCIETY)

PANAMA is rich in many things, notably, of course, the great feat of the canal itself. We had come, however—the Colonel Watres Expedition for the Everhart Museum—seeking interesting birds and mammals of the Isthmus for our collection. We found them in abundance and variety, but even though they were our central aim we could not fail to make interesting acquaintances among the reptile world of the Panaman Isthmus.

We naturally think of tropical climes as abundant in reptiles. Panama is no exception. Many snakes and their relatives claim the Isthmus as their home. Some are beautiful and dangerous; others are beautiful and harmless; some are ugly and harmful; others are ugly and innocent. Whatever characteristics they are interesting.

THE BEAUTIFUL COMMON BOA

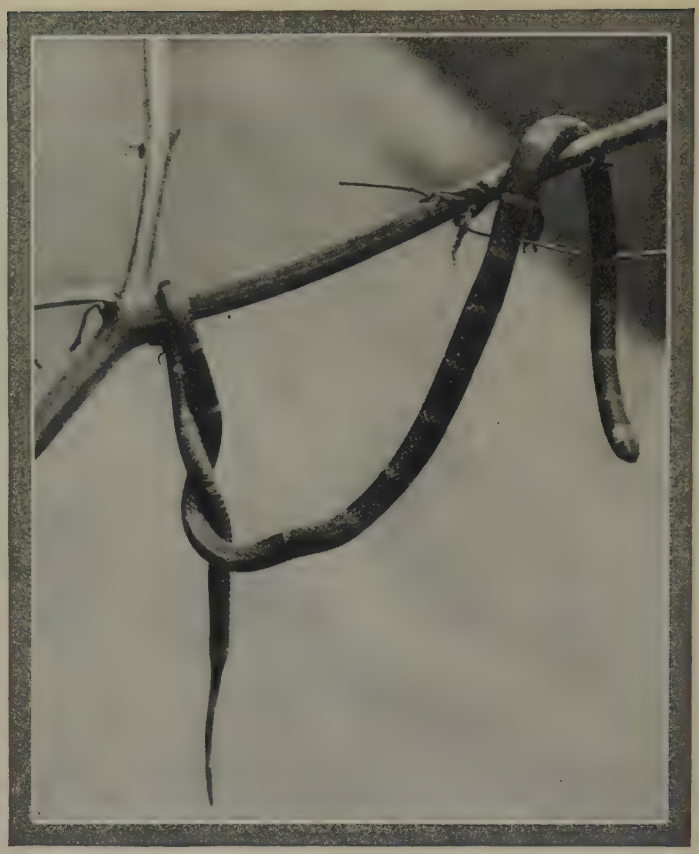
It reaches twelve to fourteen feet in length, dark brown being the predominant color.

The largest reptile we became acquainted with was the *Crocodilus acutus* of the naturalists but called alligator and "gator" by all the canal employees. It is easily distinguished from the true alligator of our Gulf coast by the shape of the jaws. In the alligator the jaw is broad and rounded like a round-pointed shovel. In this crocodile the jaws are straight-sided and become very narrow at the snout. The specific name refers to this acute angle made by the sides of the jaws. A most curious feature of the crocodile's upper jaw is that there are two perforations which permit the teeth of the lower jaw to pass entirely through. One may see the projecting tips of

these two teeth when the jaw is completely closed.

This crocodile is very abundant in Panama and is also found in the West India Islands, including Cuba. Very rarely it is seen in Florida. Every man's hand is against the crocodile in Panama. As one goes across the Isthmus on the Panama Railroad he passes over arms of Gatun Lake at various places. It is not unusual for one to hear the "pop" of a revolver shot as some passenger sights a "gator" in the water. The police officer at Gamboa had been located at that place only a year or two yet he boasted that he had sixty-eight of these reptiles to his credit.

There is some reason for the dislike of the crocodiles. One day as we were going up the Chagres River in a launch with the hydrographer of the Canal Zone we sighted a dead mule in the water near the shore. We instantly thought of the people of Panama City and of the Canal Zone on the Pacific side of the Isthmus who are all supplied with their drinking water from the Chagres. On inquiry we found that the mule had been seized by a crocodile the evening before as it stood in the water drinking. The plantation manager happened to be on the shore at the time and saw the performance but was powerless to prevent the catastrophe. When we came back later in the day we were relieved to find the mule had been



THE CORAL SNAKE

Banded with black, yellow and red, this snake belongs to the venomous group.

LEFT

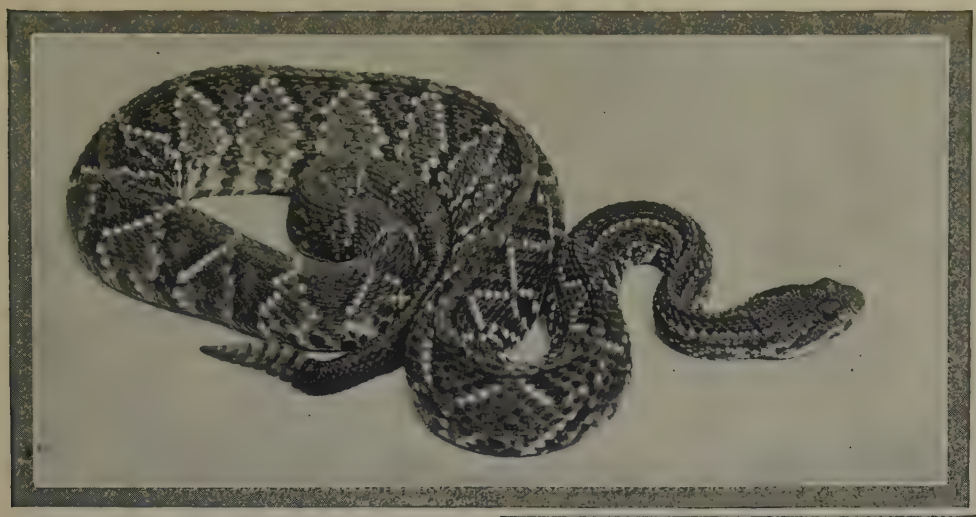
THE ANACONDA

There are authentic reports of this snake reaching a length of thirty-three feet. It ranks as the largest snake in existence.

RIGHT

THE YELLOW ANACONDA

Frequently the anacondas are mistaken for boas. This is a wonderfully marked member of this group.



SOUTH AMERICAN RATTLESNAKE

It reminds one of the diamond-back of the southern United States.

RIGHT

VENOMOUS FER-DE-LANCE

Natives call it tommy-gof and are greatly afraid of it.

BELOW

THE DANGEROUS BUSHMASTER

In length from nine to twelve feet, it combines fierceness and aggression.

removed quickly from the Panaman water supply.

Our museum specimen of crocodile was obtained in the Culebra Cut. He was sighted on the bank and the engineer turned the launch in his direction. The rifle fire soon seemed to settle his case and we moved close to shore to photograph him. We decided we would let him remain here till we returned, but our plan was quickly shattered when the reptile gave a great lurch and went into deep water. Three or four hours later when we returned we were somewhat surprised to see the crocodile on the shore again. This time the shots took full effect and we loaded the carcass on the launch and carried him to our quarters where he was prepared for the taxidermist. In skinning him nearly a handful of bullets were found under his skin. Many of them were encisted and had probably been there for years. None of them were the bullets of our party which had gone completely through his body. Probably every gunner who sent a bullet into this crocodile counted that he had disposed of one of these brutes.

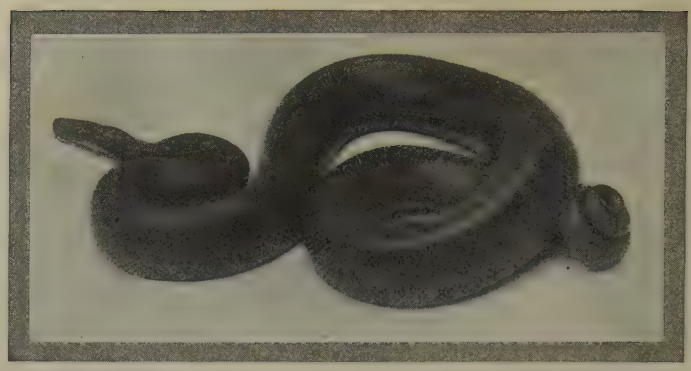
Our specimen was only eight and a half feet long but we later saw these animals in the Bayano River in great numbers and of immense size. We did not attempt to take any of these enormous specimens as we were not prepared to handle such large ones. Along the bank of a certain creek of the Bayano is where these reptiles assemble in great numbers at low tide. When the tide rises bringing in fish and other food from the Pacific these reptiles take to the water seeking their prey. While we did not bring back a full-sized specimen we secured the teeth from an old jaw which substan-

tially verify our claim that the large ones were much more than twice the length of the one we exhibit at the museum.

Of all the reptiles of the Isthmus the ring-tailed iguana is the most abundant. This lizard is liable to be seen almost anywhere. It usually keeps perfectly still until one reaches very close to it. Apparently it trusts to its mimicry of the surroundings but is off at great speed if one approaches too near. It is valued as food throughout tropical America and it is surprising that it reaches such abundance. Our party prepared one of the animals but our verdict was not entirely favorable. I think we tried a poor specimen for others speak of its flesh as excellent.

One of the animals was seen on the concrete wall at the Gatun Spillway. As usual he allowed me to approach near enough to take a good picture of him, but some movement of mine started him off on a run. In order to observe his behavior I followed after him. When he reached the parapet of the dam he disappeared on the opposite side. When I came to the wall so I could look over he was on a platform perhaps fifty feet below where he had landed from his jump. It was a mystery to me how he survived the shock on striking the concrete but I surmised that the long tail must be used to absorb the shock on such occasions. As I cannot imagine any other use for the tail and on the assumption that everything in nature has its use I make this guess.

Smaller lizards are in abundance. One of these is known as the "Jesus Christ Lizard" by the Spaniards. This may sound like blasphemy but it is not so. The Spaniards were in the habit of giving sacred names to all sorts of places and objects and this was regarded as an act of piety rather than the reverse. The reason for this name for the lizard is that it is able to run on the water. Although I did not see this feat performed I have been told that it is able to do it and that it gives such vigorous kicks to the surface of the water that the reaction sustains it while it glides swiftly over the water.

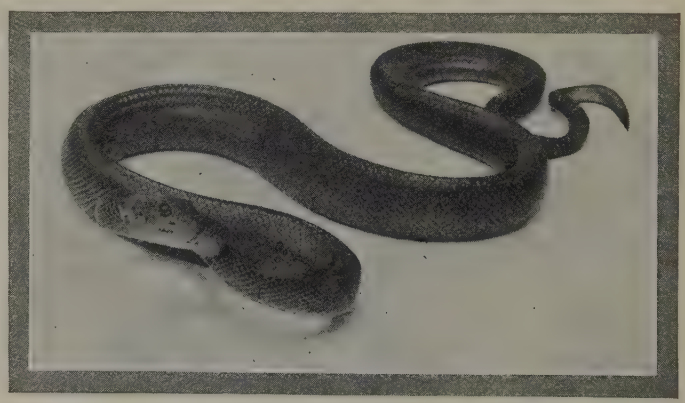


SOUTH AMERICAN RAINBOW BOA

Another and beautiful member of this reptilian group found in the warmer climates.

THE MEXICAN BOA

Its range extends farthest north of all the boas. Note the markings on its long body.



THE DOG-HEADED BOA

The reason for the name is evident from one glance at the shape of its head, which is quite canine.

When reptiles are mentioned most people think of serpents rather than lizards. Panama is abundantly supplied with snakes as well as lizards. They come in all sizes from the gigantic boa constrictor to the beautiful but venomous coral snake. A specimen of the latter was obtained in a most novel way. We were going down the Culebra Cut in the launch when the coral snake was observed swimming in the water. The engineer ran alongside and I dipped it up with the insect net. I do not know whether these snakes are in the habit of swimming but I feel very sure that few collectors have ever before caught one in a butterfly net. This specimen we now have at the museum but unfortunately the preserving fluid has destroyed the brilliant red and yellow colors and he looks like a common every-day sort of snake.

The fer-de-lance is considered the most dangerous of the venomous snakes of the Isthmus. The workmen on the canal call it the tommy-gof. I have never seen this name in print and do not know its origin. The spelling I give is phonetic. We secured but one specimen of this serpent but were assured that they are altogether too abundant.

THE CROCODILE IS AN UNPOPULAR FELLOW

He differs from our alligator in having a narrower jaw, the sides making an acute angle at the snout. This reptile is very abundant in Panama and is found on the islands of the West Indies.

There are various related species of this lance-headed serpent in South America and the most famous one is the bushmaster. Thrilling tales are told of the number, size, aggressiveness and venom of this creature. It is considered more dangerous than the diamond-back rattlesnake of our southern states. Fortunately the range of the bushmaster is somewhat limited and, so far as I know, does not include Panama. We found no rattlesnakes in Panama and heard no reports of any. There is, however, a South American species which reminds one of the diamond-back in his markings. Rattlesnakes are exclusively American reptiles and most of the species are found in North America.

The boa constrictor is the largest serpent of Panama. The specimen we secured was not of full size. One of our party had just shot a bird which fell into the thicket just off the trail. Laying aside his gun he crawled through the jungle and had reached his hand out to grasp the bird when he saw the reptile curled up almost at his fingertips. It is needless to say that he quickly retreated while the snake unaccountably remained. Securing his gun, a dose of shot was administered just back of the upreared head. There was a violent thrashing of the vegetation before the snake could be secured. When the reptile was skinned it was found to be a female loaded with eggs and this accounted for its plump form and its sluggish behavior. Boas are properly American serpents although it is quite common for travelers to speak of any large snake, such as the python of the Old World, as a boa. In tropical America there are several species of boa and the anaconda of South America is regarded as a boa by some. This is probably the largest species of snake in existence. A museum specimen of the anaconda in the British Museum is twenty-nine feet long and there are well-authenticated reports for a length of thirty-three feet. Probably there are other snakes of this kind somewhat larger but the stories of travelers of fifty and sixty feet, or even more, are gross exaggerations.

There is no other branch of natural history more subject to exaggeration and pure myth than the subject of reptiles. Probably one reason for this is the violent fear which they inspire. Most peo-

ple upon encountering a snake try to kill it. If their courage does not permit this they run away. In either case they lose the opportunity of observing the habits of the snake and make grossly exaggerated reports of the size of the reptile. The classical snake story of Livy as reported by Valerius Maximus should serve as a model. "Near the River Bagrada, in Africa, a snake was seen of so enormous a magnitude as to prevent the army of Attilus Regulus from the use of the river; and after snatching up several soldiers with its enormous mouth, and devouring them, and killing several more by striking and squeezing them with the spires of its tail, was at length destroyed by assailing it with all the force of military engines and showers of stones, after it had withstood the attack of their spears and darts. It was regarded by the whole army as a more formidable enemy than even Carthage itself; and the whole adjacent region being tainted with the pestilential effluvia proceeding from its remains and the waters with its blood, the Roman Army was obliged to remove its station." He also claimed that the skin of the serpent was 120 feet long and was sent to Rome as a trophy. No modern story teller can hope to equal this old Roman in the range of his imagination.

One group of reptiles, the chelonians, seemed as scarce in Panama as snakes are in Ireland. Not a single turtle or tortoise was seen or heard of by any of our party during our stay there. To be sure, there may be some in some parts of the country but none came under our notice. This seems rather remarkable in view of the fact that in the Galapagos Islands to the southwest in the Pacific there are great numbers of gigantic land tortoises. These tortoises of the Galapagos have been the wonder of naturalists ever since Darwin published his observations upon them. Their survival there, till man's arrival, has been explained by the fact that there are no large predaceous animals on the islands.

While live reptiles are offensive to most people we find that there is a certain fascination about them. When they are dead and mounted as museum specimens they attract visitors fully as much as the most beautiful birds. I have often heard people say, "I hate snakes," and immediately go to the reptile cases where they look over the specimens with evident interest. Their fear of the animals being removed they can look at them deliberately instead of fleeing, as they do, at the first glimpse of one in the living state. Our experiences with the reptiles of Panama is one of the most interesting memories.

A CLOSE-UP OF THE ISTHMIAN "GATOR"

Note the two foremost spikelike teeth. These fit neatly into perforations in the upper jaw and show through the top. Inhabitants of the Isthmus boast of the number of these reptiles they have shot.

The article on page 145 is the first of a series on fish by Captain Menander, elaborating on his story of the Sargasso Sea in the July issue of NATURE MAGAZINE. Another article will appear in an early issue.

Murre Multitudes

By WILLIAM L. AND IRENE FINLEY
Of the National Association of Audubon Societies

(PHOTOGRAPHS BY WILLIAM L. FINLEY AND H. T. BOHLMAN)

THE WARM south wind blowing its wave of white and yellow flowers across fields and hills, also touches lightly the ocean with its message of spring. Off the Oregon shore schools of shad, smelt and salmon feel the urge, and the coastal waters stir under the spawning impulse. The flank of every green wave is flecked with birds of seal-brown, wearing white waistcoats. These are California murres. Every schooner that plies the trade pushes its way, mile after mile, through these great rafts of sea fowl. Fed fat on the fingerlings of southern waters, with one accord they now take thought of sea-girt rocks, carved by wind and wave along the northern shores.

The murre multitudes are moving under the homing instinct, pressing north with flap of wing and patter of foot, lifting now here, now there, rising and falling in the trough of white-tipped waves. They move steadily and with purpose, as vast armies move. June awakens to find the myriads of the murre tribe gathered thick on cliff, crag and pinnacle for three thousand miles of rugged coast line. The very basalt and granite are warmed by the mothering multitude.

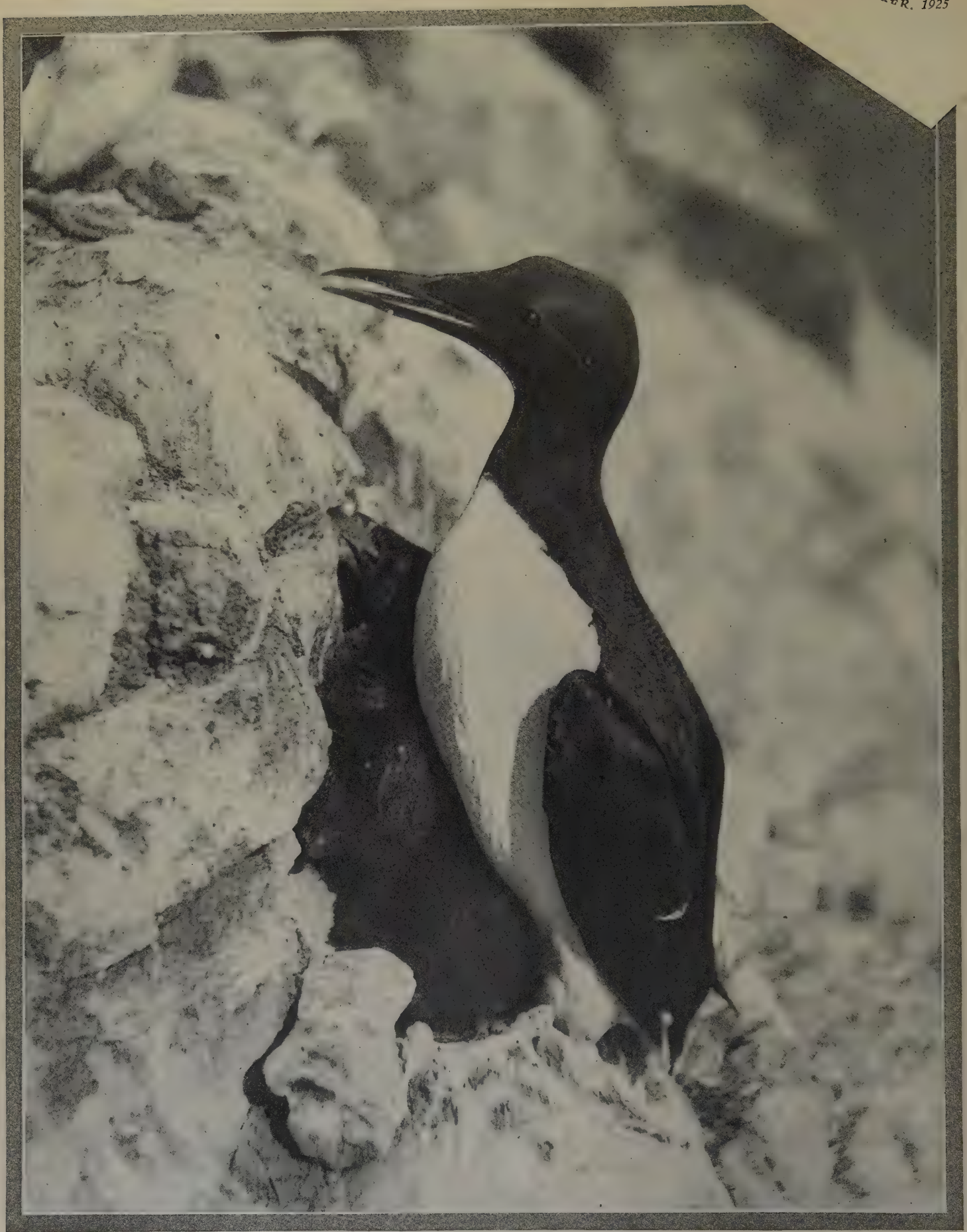
Among our diving birds that live beyond the shore line, the murre is the most populous species of the sea. One might wonder how there came to be so many of them. The reasons are sufficient. Although the mother murre cradles but one egg a setting and a duck or grouse may lay from ten to fifteen eggs a season, the latter have decreased rapidly in numbers everywhere, but the murres still remain something like the numbers of yesterday. They have certain traits and habits that have helped them to grow and flourish, while their cousin, the Great Auk, has lost out in the long struggle.

The Great Auk was the only North American bird incapable of flight. Like the murre he lived on the sea rocks, where it was handy to flop into the water and eat his fill of fish fry. All he had to do was to climb back on the rock again and sit around, not even exercising his wings, until another hungry spell was on. Did he formerly have the power of flight and lose it through disuse, or had he never attained the flying stage? It is hard to say. Time passed without his knowing that the age of man was full upon him. Then naturalists discovered he had been pushed over the edge of the universe and was gone for good. The last records of the species were a single bird killed in 1842 off the Newfoundland coast, and a pair in 1844 on some rocky islands near Iceland. All that remains of these flightless swimmers are about 70 skins, 65 eggs and some 25 more or less perfect skeletons. This is just what might happen to the penguin families of the south Arctic. They walk along like foolish people, with their heads in the air, without a thought that some day they may have use for wings.

The murre is not so helpless. He is built upon serviceable lines, equipped for the life he leads. Not graceful in flight, like the gull, he cannot poise, turn quickly, drop or rise with ease, but he pushes forward on rapid wing, swift of purpose and bent upon business. He rises from the sea with difficulty, splashing along the surface to get a start. His legs and webbed feet are at the very

TWELVE APOSTLES OF MURRE ROCKS

These birds do much of their sitting standing. They are abundant along the Pacific coast, and are sometimes called Farallone birds.



MOTHER MURRE WITH HER OWN AND NEIGHBOR CHICKS

CALIFORNIA MURRES IN CONVENTION ASSEMBLED

end of the body, so he walks quite as easily as a man would with his feet tied, but his feet are where they are most useful as propellers. He needs them more for water than for walking on land. He flies below the surface more expertly than he does above, using his wings like the side flippers of a seal. A stiff tail as a rudder helps him turn and twist quickly in the chase for fry.

Fortunately the flavor of murre meat has not tempted sportsmen, as has the taste of our river and sea ducks, yet in many places fishermen and other sea-folk are not unmindful of the thousands of murre eggs that lie thick on the sea rocks, for these, when fresh, are fit for food.

On the California coast the product of the murre was commercialized for many years. As early as 1850 the Farallone Egg Company was organized to collect eggs and ship them into the San Francisco market. It was estimated that 25,000 dozen eggs a year were taken from the Farallones up to 1873; after that an average of about 15,000 dozen were shipped annually, but by 1897 that number had decreased to 7,645 dozen, showing that traffic was more than even the murre numbers could bear. The following year the Government prohibited the taking of eggs. Off the California coast was the only place in the west where murres were robbed continuously to such an extent. In many places the murre multitudes have been undisturbed, and it is like going back fifty thousand years in the past to visit some of the great murre loomeries, or colonies, along the shores of the Pacific, for there is not the least sign of civilization.

RECRUITS TO THE MURRE RANKS

To the left an egg pipped; in the center a newly hatched youngster, and on the right a chick several days old.

The murre is a tenement dweller because he prefers it. He likes the jostle and feel of the mob. Someone has said he would die of lonesomeness if separated from the flock. A space of but a few inches is all he needs for a home. He makes no nest. When he sits down he looks as if he were standing up. No social settlement worker could visit a big murre colony without complaining of the living conditions. Yet, for all this, Mother Nature seems to have made abundant provision for her murre children.

A single egg is all one pair of parents can attend to. It has to be held on the shelf, day and night, during the period of incubation, so each takes a turn. If unguarded it is too likely to be jostled over the edge, or gobbled up by some watchful gull. Fortunately it has a tough shell so that even when buffeted about it does not break on the sharp corners of the rock. It is shaped like a top, so in case it starts rolling toward the edge of the ledge it naturally swings around on its own axis and stops a few inches down. These little things may seem of small moment, but they play their parts in the very existence of the species.

It is a comedy to watch the daily round of life in a big loomery. When an old murre returns from the fishing ground he takes a good start off seaward to gather speed so he can swing up to the eaves of his home rock. Like a man in an airplane, safe landing is often a puzzle. Twenty paces from the ledge a murre looks uneasily for a soft spot, then begins back-pedaling rapidly and, with webbed feet spread, he heaves in awkwardly and lands with the same lack of grace a man sometimes does when he inadvertently puts too much trust in a patch of glare ice, or unconsciously treads on a banana peel.

The landing accomplished, he stands upright, fanning his wings to get the muss out of his dress suit, and finds himself like one facing a Fourth of July crowd. There is no opening so he begins squeezing in, pushing and shoving to the right and left. The neighbors resent this and peck at the new arrival with their long sharp bills, while he dodges and presses on, amid opposition and complaint, until he reaches his mate. They change

places and he takes up his vigil on the egg. The mate, instead of taking flight from where she stands, goes through the same performance in reverse order, neighbors protesting and speeding the parting sister with a fusillade of blows, until she arrives at the edge and drops off into space.

MANEUVERING FOR A LANDING

The murre returning from a fishing trip. He lands awkwardly, back-pedaling with web feet well spread out and then lighting in a sprawl.

Even though there is not a sign of a nest, and no lines to mark one home site from another, yet the life of the murre is not entirely haphazard. Looking over hundreds of eggs lying along the ledges one can see a regular spring flower garden of tints. You might wonder who the artist was who designed thousands of them, and no two alike. The eggs have a ground color of pure white, various washes of gray and brown and a dozen shades from light to dark blue. Upon this background is spread an elaborate pattern of splotches of all sizes and shapes, sometimes thickest toward the larger, sometimes on the smaller end, and often marked all over. Eggs without a mark and others with spots of brown, reddish or velvety black. Some are daubed as with a brush and others scratched from end to end as with a sharp pen, and finished off with flourishes and scrolls. It is easy to imagine that these variations in size, shape and color are of practical use in helping the mother murre to recognize her own egg.

When all the birds are scared from a colony, the first one to return pitches awkwardly in. She sits clucking and craning her neck, then hobbles up the rock to the first eggs, bowing and looking around. On she goes in her straddling gait, stops to cock her head to one side, till she may pass from twelve to twenty or more eggs. Finally she pokes one gently with her bill, looks it over and tucks it under her feathers. The ledge is soon full of birds, all complaining and pecking at each other and shuffling around to find their own.

It is much the same when the eggs are hatched and the young are crowded together at the back of the ledge. The first mother lands and bows elaborately, and starts calling in cries that sound at times like the bass voice of a man and vary all the way up to the cackling of an old hen. It is bedlam turned loose with the young birds all crying at once. The first one that comes up seldom qualifies, for the old bird pecks and knocks him over. At last she finds her own chick and tucks him under her wing.

A NEW BROOD OF MURRE CHICKS

In the foreground one is just coming out of the shell. When the parents leave the chicks crawl together away from the dangerous edge of the cliff.

American Hydrangeas

By STEPHEN F. HAMBLIN
Director, Harvard Botanic Garden

OF ALL the shrubs in gardens with midsummer blooms the Hydrangea is the most commonly seen. The one plant that is universal in northern gardens, panicle hydrangea, came from Japan some sixty years ago. Our American species, which are much more useful as ornamental shrubs, are not much planted, however. Most of the oriental species have the flower cluster in pyramidal panicles, triangular in outline, whether the flowers are normal or entirely showy. The American species have the flowers in a flat cluster, a sort of enormous carrot or Queen Anne's lace effect, and the "double" forms are in globular clusters, round in outline.

The one exception is the tribe of the house hydrangea and its forms (*H. opuloides*) from the far east, which has the habit of growth and flower cluster, often red or blue much as our own species, but the leaves are thick and shining green, wholly unlike any of our own species. This is almost as common as the panicle hydrangea, especially in the regions of the less severe winters. The hydrangeas that you do know are probably either the one with panicled flowers, or with shiny leathery leaves. It is time for you to know our native species in the woods and grow them in gardens.

The most widely distributed native species, smooth or wild hydrangea (*H. arborescens*), is offered by dealers and somewhat planted, usually in a small clump on a lawn, its beauty diminished by the near presence of a big mass of the panicle hydrangea of Japan. To realize what our plant can do you should see it in long stretches through the open woods and along fences from New Jersey through all our southern hills. Though labelled tree-like by the botanists, it is a low and slender shrub, often not breast high, but in half shade becoming five feet tall. It might better be called herb-like, for though a real shrub it makes a big clump-like crown and sends up many slender, smooth, green stems. It often dies back of its own accord and may be cut back severely. It makes best bloom from new shoots starting near the ground. The leaves are opposite, ovate, sharply toothed, on long, slender petioles, smooth and pale green on both sides, but unlike any foreign or other native species

PHOTOGRAPH J. HORACE MCFARLAND CO.

THE PANICLED HYDRANGEA BLOOM

American species can vie with Japanese importations and should be more planted.

PHOTOGRAPH J. HORACE MCFARLAND CO.

SMOOTH OR WILD HYDRANGEAS—THE OUTSTANDING NATIVE SPECIES

They are hardy and beautiful, particularly in expansive planting, and the dried clusters persist through the winter. The snowball effect makes a striking addition to any home grounds.

they are thin and translucent, more like the foliage of some garden herb. Yet these leaves stay green late in November, after all others have withered and fallen.

The flowers are the object of your search. It is not difficult to see them, in June and July, large flat clusters of tiny yellowish-white blossoms with a few showy, useless ones around the rim. The dried clusters later persist through the winter, for the little seed capsules are tiny and look more like dried flowers. The flower effect is not startling, but a field of them is very pleasing, and even a solitary plant gives a better show of bloom than the white forms of the summer-blooming spireas that are now so much in fashion.

Possibly the flower cluster could be speeded up a little by the increasing of the showy outer flowers to get more of a viburnum or snowball effect. This improvement could easily be made, for selection for larger sterile blossoms would soon give results. Possibly the effect has been overreached already, because some twenty years ago someone found a form wild in one of our midwestern states, a form with all the flowers showy and sterile, making great round popcorn-like blobs, like an over-ambitious snowball, from June to August. This freak cluster is green at first, then whitens to snow white, and again fades to dingy green and ash brown to hang all winter. It is a bit overdone, the slender stems cannot support the mass, and all flop forward on to the grass of the lawn.

As a work of art this flower cluster is hardly more elect than the ever-present pyramid of the sterile form of the panicle hydrangea, and these latter are held up by the stems to some semblance of order. An intermediate stage between the "single" carrot cluster and the heavy "snowhill" would give a shrub of great value for summer bloom.

No shrub is easier to grow. Any soil of lawn-bearing virtue is enough for it, and full sun is not

necessary, though desirable. There are no insects or diseases to bother, and propagation is extremely easy, from cuttings, or just dividing the clump like a phlox or other herbaceous clump. Pruning in the spring can be any barbaric butchering, and any smashing from winter snow will soon be remedied by new shoots. Its absolute ease of culture is its great asset. It is rather coarse for refined effects, but in large plantings it is most excellent as a robust low shrub for facing down high masses. No hydrangea is a shrub for intimate affections, but our species is better than the common Japanese affliction.

Our southern hills have another similar species, ashy hydrangea (*H. cinerea*), possibly less vigorous and the flower clusters not so large. But the chief difference is that the thin leaves are densely gray downy below. The foliage is browned by hard frosts of autumn. It blooms with the other and is scarcely different to the eye in mass. Though native to the lower Alleghanies it is perfectly hardy. The sterile form of this was found some thirty years ago in Ohio, but though better than "Snowhill" it is little seen, rarely advertised, and has no common name. All that has been said in favor of "Snowhill" is true also of this, and the flattened snowball clusters stand erect. It is absolutely the most decorative of all white garden hydrangeas, as good as any white form of the house hydrangea, and perfectly hardy. I suggest that you yell for it until you get this—with leaves ashy gray below.

The third southern sister from the mountains of the Carolinas, silverleaf hydrangea (*H. radiata* or *H. nivea*) was once quite commonly planted. It is very like the ashy one, but the leaves are a dark green, turning black in the frosts of October, but silvery white below. The sterile row of flowers is larger and the wild form more showy than the other two. It is the best of the three as a wild plant, but there is no garden form with the sterile snowball shape. It is just as hardy as the others and should again be in favor. The plant labelled *H. canescens* is perhaps a hybrid of the thin green *H. arborescens* and the thicker, silvery *H. radiata,* for the result is much as the ash-colored ashy hydrangea in flower and leaf.

Most unusual is the oakleaf hydrangea (*H. quercifolia*), the other American of the hydrangea group. It is a coarse, stout shrub to some six feet, with enormous wavy-lobed leaves like those of the sprouts of a black-oak stump, but opposite, and white downy below. It wins a look from its extraordinary foliage. The flowers appear in July in elongated rounded panicles much like the panicle hydrangea, with sterile flowers scattered through the cluster and tinted pink as are the old flowers of the panicle species. It is wild from Kentucky to the Gulf, and it may be grown much farther north. Though it may kill back too much to produce many flowers, the peculiar foliage will be freely produced.

If you have a desire for hydrangeas, and their artistic merits can be proven, try the wild types or garden forms of our three hydrangea sisters from our southern hills.

And the Fence Post Grew!

THIS photograph is of a catalpa tree which grew from a post planted in the spring of 1878. During the winter of 1877–78 a gentleman of Fairview, Pa., cut down a number of catalpa trees and prepared them for fence posts. In the spring he planted a number of the posts. The one in question has eight holes in it and was used at the bars. During the summer the gentleman noticed a shoot on top of the ground and gave it support. The first season it grew three feet

and the following year it attained a height of six feet. The shoot has been growing ever since and is now a tree measuring 7 feet 2 inches in girth. It is 40 feet high and has a spread of 45 feet. That the Catalpa has exceptional powers of recuperation is indicated by its ease of recovery from the ravages of the Catalpa Sphinx Moth (*Ceratomia catalpae*). The caterpillars often attack the tree in such numbers that scarcely a leaf is left, but it recovers soon.

The Land of the Wild Mountain Goat

By WILLIAM T. SHAW

(PHOTOGRAPHS COPYRIGHTED, 1923, BY THE AUTHOR)

ONE MORNING, in a remote Washington forest town, on the banks of a swiftly rushing mountain stream, we stood watching the deft swing of ropes thrown knowingly, and leashed securely, over and about the pack saddles of heavily ladened trail horses. One moment we watched, all keen with interest, this strange preparation for travel over forest paths, and the next found our eyes drawn quite irresistibly up through a long, gradually rising canyon—far away, up onto the distant snowpeaks of the higher mountains—far up and beyond, into the land of the wild goat; for here, too, we were to go, shortly, into this land of the wary, wild, mountain climbers.

That night we camped by the side of a wee brawling brook, known by the curious, quaint, wild name of Stujack. It was rapidly coursing a steep slanting mountainside and rippled by our transient mountain home noisily — hurrying, soon lost again among moss-gray, giant trunks of century-old cedars and firs. We liked this little brook, and were not keen to leave when morning came.

Two days found us at the end of the trail. Here horses could go no further, up into the land of the great mountain. We said good-bye to our packer, and soon were quite alone, now to be employed for a day or two in scouting and exploring possible ways to the high country.

At the end of our rest period we felt again the touch of the firm trail earth against our feet, and the weight of heavy, six-day packs, upon our shoulders. We crossed the Whitechuck—milky with flour silt, ground from the glacier fields far and away on the mountainside.

All would have been orderly and peaceful, but for the rain!

By nighttime we were weary, wet, and ready for rest; deep in a forest of endless, numberless, gray-brown trunks—a forest of gloomy shade, carpeted with an abundant, shoulder-high huckleberry brush, the countless leaves ladened with a veritable cloudburst of harvested raindrops, making the mountain storm doubly wet. In this we found night. It was then the great horizontal branches of a leafy hemlock sheltered us, and through the early hours, we sat against the massive trunk, piling high, sodden slabs of mouldering logs and resinous bark, torn from decaying stubs of broken trees, upon a glowing furnace of heat which we had gradually built from a small beginning. By midnight all the clothes we wore were thoroughly dry and soon we were asleep in blankets from our packs—soon again to be awakened by the early sun of a summer morning.

That morning we easily crossed Fire Creek, which we had found formidable the night before, for the chill of its darkness had tightened up the snow-fed springs of its mountain source.

THE WILD MOUNTAIN GOAT

Soon shadows in the niche of rock against which he stood emphasized his sturdy, mountain-climbing limbs and rugged body.

Now began the final climb to snowline. Presently we came out of the forest into a "burn," where naked tree trunks stood here and there on a mountain slope of many thousand acres of forest-fire desolation. Up, up, we toiled, for now the grade was sharp—naming mentally, a point to strive for, only to name again another yet a little higher. Now we paused to watch a circling hawk, again to contemplate a mother grouse with her little brood. By and by we conquered the "burn," and were rewarded by gaining a park of alpine fir and gaily painted mountain flowers. That night we camped at snowline. Here at last, was at least the edge of the land of the wild mountain goat.

At six thousand feet we lay, with here and there a patch of snow still lingering among the heather, lay again in blankets, watching the night creep in over a high-mountain landscape; but it was not till early dawn that we saw the beauty and magnitude of the scene. Over to the east, dawn-tinted, rising from the depths of ash-gray canyons, grandly rising into the pure morning sky, from a landscape of miles and miles of lesser domes, stood this great peak of the wild land. Ten thousand feet and more it rose, up from the level of the not too-distant sea; rose into an atmosphere permitting of little less than never-melting snow, giving a resultant product of seamed glaciers, snowfields, and barren cliffs.

GLACIERS AND RUGGED MOUNTAINS

A few feet behind the figure in this picture were three fresh goat tracks, a kid and two elders headed for the high country.

And this was the land of the wild goat! They were not abundant, and only nine were seen in the six days of our stay on this mountain. Towards evening they could now and then be seen, but always distantly, crossing a snowfield or passing a rock slide, singly, or in little bands, but seldom at a range not requiring the use of field glasses. But the unexpected opportunity of a close-up was coming, though not on this mountain, but on a peak standing fifty miles to the north, near the Canadian boundary line, a good long trek away.

We, two of us, had been out that day, chiefly for landscapes. Our work lay in a pass between two ice domes of around ten thousand feet each. The work was nearly finished, and but two unexposed plates were left, when far away on the upper wall of a head-water canyon a goat was sighted. For nearly two hours we stalked stealthily along the cliffside, and then to our astonishment, on looking over a rocky point, found that we were scarcely more than twenty-five or thirty feet from a fine wild goat. When first seen he had been pasturing, but had almost at once climbed to the flat bottom of a mountain hemlock stump which had been torn from the cliffside during winter storms. Here he lay, half asleep, basking in the late afternoon sun.

Cautiously we arranged the camera, propping it into position with flakes of rock, picked from the goat trail. The first exposure, we found later, gave no result, as the camera had slipped slightly with the release of the shutter. Again we focused on the goat, and in order not to have a duplicate exposure, decided to try to get him into some different position. Very slowly we started to climb to the rock beside the camera in full view of the animal. At first he paid no attention, but then, eyeing me keenly, he got up, and after a moment drew his body into one great muscle-straightening stretch. Then quietly he looked around, and just as he paused a moment looking into the canyon below, with the tips of his black horns standing vividly against his white shoulders, the second and last exposure was made.

Still he was not unduly alarmed, for our every move was slow, and we spoke only in whispers; a part of this subsequent conversation being of vital interest to the goat had he known it—for we were on state biological work and had with us the means with which to secure him by a pull of the trigger.

Our decision was, however, in the light of the alarming decrease of these animals, *not* to disturb the unity of this wonderful situation of profoundly beautiful high-mountain landscape and peaceful wild life.

That night the news of the adventure with the goat had been noised about camp, and the curiosity so aroused as to the result of these exposures, together with no small amount of personal inquisitiveness, that it seemed the only polite thing to do was to develop the exposures at once. A packing box and a few blankets together with the cover of night soon made a temporary dark room, and I never shall forget the wonderful thrill of satisfaction, toned with a subtle romance of the situation which gradually came over me at the success of this silent shot with a camera, when after a few moments a clearly cut image of free, wild, unhampered mountain life began to appear on the plate. Soon shadows in the niche of rock against which the animal stood began to emphasize his sturdy mountain-climbing limbs and rugged body. Little traceries of shrubbery began to clothe the cliffside. The white thread of a canyon stream gleamed from deep below, and away, far in the dim distance lay a mountain landscape of numberless, unnamed peaks, peaceful, hazy, the silent rugged landscape habitat of the wild mountain goat. There he was, safe upon our negative, "shot" but still roaming the cliffs of his native mountains in the true-footed freedom.

"SHOT" IN CHARACTERISTIC SURROUNDINGS

He paused a moment, looking into the canyon below, with the tips of his black horns standing vividly against his white shoulders.

In store for the readers of NATURE MAGAZINE is a long list of fascinating articles. October will be notable for articles by Albert Payson Terhune, William Leon Dawson, Edward A. Preble, Ben Hur Lampman and Harold McCracken.

The One Who Talked and the One Who Worked

By PERCY MUNSON BARR

THE HONORABLE WILLIAM BROWN rose slowly to his feet behind his desk on the floor of the Legislature, cleared his throat, and began to speak. With boisterous sentences and the time-worn phrases of the professional politician, punctuated with vigorous thumps on his desk, he launched a tremendous attack on an item in the appropriations. This was no haphazard oratory by the Honorable William; for weeks he had waited patiently for this moment, and had laid his plans carefully. As he spoke he noted with satisfaction that two of the party heelers from his district sat in the visitors' gallery; no coincidence, that! As he spoke he knew that on the editor's desk of the party newspaper in his home town there lay a copy of his speech which tomorrow would appear under the headlines, "Honorable W. Brown Flays Government Waste." He had attended to that.

This article by a member of the class of 1925 at the Yale Forest School was awarded first prize in the annual contest for the Charles Lathrop Pack Forestry Foundation Prize. These awards have been established in nine forestry schools to encourage development of popular presentation of various phases of the forestry issue by student foresters.

He knew only too well that such headlines were badly needed to bolster up his political reputation in a district where he had never been able to secure more than the barest margin of a victory in a long series of election campaigns. And now as election time loomed up unpleasantly close again, after a legislative session in which he had felt the storm signs of declining popularity among his constituents becoming all too evident, he had searched desperately for an opportunity to thrust himself into the political limelight again. The opportunity offered itself in a proposed appropriation for a state forest in the part of the state farthest from his own district. There was not much money involved, and as far as he knew there was no good reason why it should not be spent; as a matter of fact he knew little about the subject. But the people in his district were not interested in forests, that much he did know, and in all his political experience the old slogan of "Cut Down Expenses and Reduce Taxes" had never failed to secure votes.

The Honorable William made a fighting speech, demanding the withdrawal of the offending item, denouncing the proposed waste, and naming a hundred ways in which the money could be better spent in his own district. The old slogan was used freely again, his desk suffered a perfect bombardment of thumps. Other members of the Legislature, uneasy in the face of the oncoming election, hurried to his assistance. The appropriation was defeated and the champion of economy felt a pleasant glow of satisfaction; his party heelers went home with a replenished supply of political ammunition to bang away in campaign meetings; the headlines were in red ink.

In the following election the Honorable William Brown was returned to the State Legislature as the member for his district.

. . . . . .

Ranger Bill Brown turned stiffly in his saddle as his horse came slowly over the last pitch in the switchback where the trail came out on the cutbank above the river. The tired animal needed no word from its rider to stop but stood motionless, with its head hanging limply and the flies buzzing about its sweating flanks and shoulders unheeded. The ranger leaned across the saddle horn, one leg swinging free from the stirrup, and gazed silently at the scene before him. Below, the river swept smoothly around a great bend among the cedars, rippled across the boulders at the bottom of the cutbank, and flowed swiftly on, disappearing around another bend a quarter of a mile down the valley, leaving a quiet backwater just below the high bank, where flecks of foam circled noiselessly and interminably. Beyond, the unbroken green canopy of the forest swept across the bottom of the valley and stretched up the mountain side, the gray-green of the firs and cedars deepening to a darker shade where the spruce and balsam covered the upper slopes. In the distance the panorama of hills and rocky peaks was dimly visible through the haze of the summer afternoon. The stand of timber here was the best in the whole district; unscarred by fire or the ravages of lumbering, it stretched for miles along the river valley, an almost priceless living resource able to supply forever a thousand needs of the rich farming and industrial communities that would some day be found along the lower reaches of the river.

Ranger Brown was tired—he had never been so tired before, he thought. Through a long and tiring fire season he had been forced to strain every effort to match his slender organization of men and equipment against the almost irresistible force of

the fire demon. A dozen times it seemed as if the red enemy had won, only to be checked on the fire line by another heartbreaking effort with axe and shovel. Now, when there seemed to be a lull in the struggle, with every fire out or under control, he was on his way to the ranger cabin up the river where the road cut across the head of the valley, to "rest up" a few days, and get rid of some of his long overdue correspondence and reports. He would be at the cabin by nightfall; how good it would be to get cleaned up again, have supper in the old shack, and tumble into bed, between clean blankets, while the pony rolled clumsily and contentedly in the corral or munched tall cool grass in the little meadow behind the cabin.

As his eyes roved across the hills and up the valley, he suddenly stiffened a little in the saddle, sat motionless a moment or two—then reached for the field glasses hanging in their case at the pommel. He trained them on a point across the valley for a long time, then dismounted and leveled them upon it again. He had made no mistake, a thin wisp of smoke was rising lazily from a patch of fir on a little knoll just below the dark green of the spruce on the long slopes of the mountainside. It was three-quarters of a mile away, he guessed. He put the glasses in their case again and thought it over. There was no one up at the cabin, and the phone line was down. The nearest help was at the ranch, ten miles down the river. If he went on to the cabin tonight and came back in the morning he couldn't get to the fire much before noon; most likely it would be too big for him to handle then. But to tackle it now, alone, was too much; there was a limit to what a human being could be expected to do, anyway. But what if it got away? He instinctively pictured the clouds of smoke rolling up the valley and the flames roaring up the green slopes, the dull crash of the trees falling. . . . Oh, well. . . .

Ranger Bill Brown tied his horse to a tree, unfastened his axe and shovel, and loosened the saddle cinches. Tools on shoulder he walked wearily down the switchback, waded the river where it rippled over the boulders above the backwater and disappeared among the cedars on the opposite bank. Two hours later he had reached the fire, a mass of smouldering embers in the fallen trunk of a lightning-riven fir. By tomorrow the red enemy would have burst into life in the dry litter beside the fallen tree and would have been sweeping up the valley, irresistible.

The sun was setting behind the hills when the ranger had ringed the charred wood with bare earth and the last flame was smothered. It was quite dark when he reached the river again and heard the friendly whinny of his pony on the opposite bank. He stumbled through the swift shallow water again, his legs numb with fatigue, climbed wearily to the top of the cutbank, and in a few minutes rode along the river trail through the darkness. The forest seemed very quiet tonight; as he rode the branches brushed lightly against his face and arms—there seemed almost to be a friendly, grateful touch in the feel of them.

The following spring Ranger Bill Brown was notified that the ranger station on the river trail was to be closed due to insufficient appropriations by the Government and that his services would no longer be required to guard this forest land.

THE LEAF PUZZLE

On page 121 of the August issue of NATURE MAGAZINE *there were published photographs of nine leaves. Following is the identification of these leaves:*

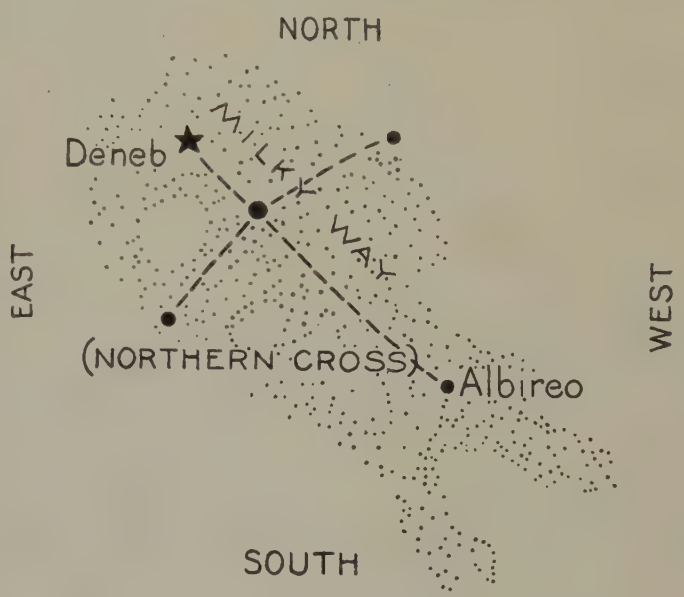
1. Holly Fern, Cyrtomium falcatum; 2. Marguerite or Paris Daisy, Chrysanthemum frutescens; 3. Fuchsia, named after Leonhard Fuchs, German professor of medicine and a botanical author; 4. Begonia Rex, sometimes called elephant's ear or beafsteak geranium; 5. Rose; 6. Snap-dragon, Antirrhinum, named from the Greek derivation meaning snout flower, because of the shape of the flower; 7. Bougainvillea, named after de Bougainville, a French navigator; 8. English Ivy, Hedera helix; 9. Geranium, Pelargonium, named from the Greek derivation meaning crane, because of its beak-like fruit; also, pelargonium means stork for the same reason.

The Northern Cross in the September Skies

By ISABEL M. LEWIS

HIGH in the sky of early September nights stretches the Northern Cross, embedded in the Milky Way and surrounded by a field of stars of great beauty. From mid-latitudes of the Northern Hemisphere, at nine in the evening, you will find athwart the meridian and directly overhead this cross in the constellation of Cygnus, The Swan. Adjoining it on the east is the small constellation of Lyra, the Harp, with its brilliant Vega.

Unlike Crux, the Southern Cross, pride of the Southern Hemisphere, which is remarkably small and compact in form, the Northern Cross is large and somewhat crude and irregular in outline. Both have for backgrounds exceptionally brilliant fields of stars in the Milky Way. There are found, also, numerous dark nebulous regions like dark holes or "Coalsacks" among the brilliant star-clouds. Astronomers now know that these seeming gaps and chasms in the dense, starry backgrounds of both Northern and Southern Cross are vast clouds of dark meteoric, dust-like particles swirling through space and thrown into relief against a brilliant background of stars. They occur everywhere throughout the Milky Way, but are particularly in evidence in Cygnus, in the vicinity of the Northern Cross, as well as near Crux, the Southern Cross.



The Northern Cross overhead in mid-latitudes of the Northern Hemisphere at nine p. m., September first. To use this map hold it over the head with the top toward the north.

Deneb Cygni, also known as Arided, at the top of the Northern Cross is its brightest star and is classed among the twenty brightest stars in the heavens though at the bottom of the list, with Regulus in Leo and Fomalhaut in the Southern Fish. So far, as spectacular splendor goes, Deneb is not to be compared with the magnificent Vega, nearby, or with Sirius, brightest of all stars, or Arcturus in Boötes, now nearing the western horizon. Yet appearances are at times quite as deceptive among the starry hosts as elsewhere. Deneb is, in fact, a true giant among stars, far outclassing in true or intrinsic brightness Sirius, Vega or Arcturus, so brilliant because of comparative nearness, astronomically speaking, to the earth.

Albireo, at the foot of the Northern Cross, a star of the third magnitude, is also a noteworthy object, a favorite of all who possess small telescopes. It is famous for being the finest double star in the heavens that is easily within the reach of small telescopes. The two stars of which it is made up are of the beautifully contrasting colors of blue and gold. Many other doubles in the sky are fully as beautiful in color as Albireo, but comparatively few of them are within the reach of small telescopes.

The ability to separate a certain star known to be double into two stars is often made a test of the power of a telescope. Some stars are so close that only the most powerful telescopes will separate them and some, even these telescopes cannot separate. It is a little instrument known as the spectroscope that then reveals to the astronomer the fact that what appears as one star in the telescope is really a system of two stars revolving around one another. Systems of three or more stars in revolution about a common center are also to be found in the heavens though they are not so great in number as the double-star systems of which Albireo is an excellent example.

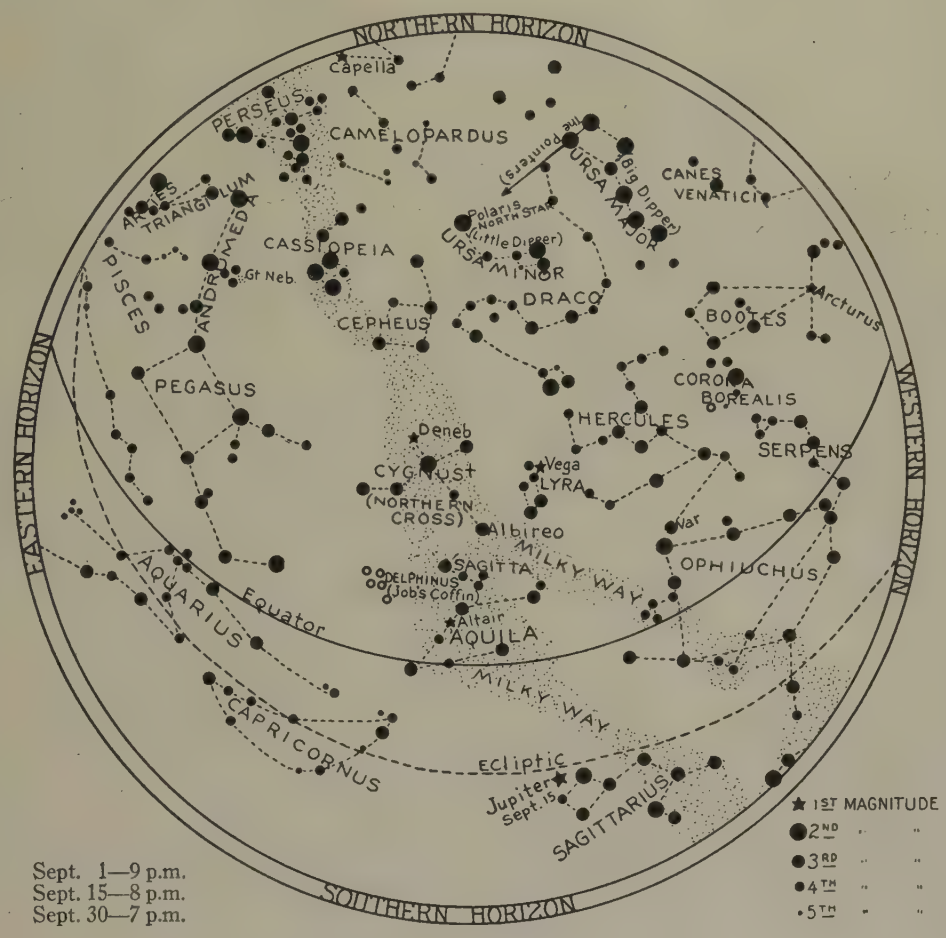
Gamma Cygni, which marks the intersection of the cross-arm of the Northern Cross with the upright, is a star of the second magnitude. Delta and Epsilon, which mark the western and eastern extremities of the cross-arm respectively, are third magnitude stars. All the principal stars that outline the form of the Northern Cross are bright enough to be readily recognized even against the brilliant background of the Milky Way.

Though generally rated inferior to the Southern Cross in beauty, certainly by all inhabitants of the Southern Hemisphere, who cherish the configuration made famous by the early explorers of Central and South America, our Northern Cross is, nevertheless, one of the beautiful groups of stars in

the heavens and should be known to all. The possessor of a small telescope will find also in the Milky Way in Cygnus a rich field for exploration, one of the finest in the heavens, abounding in the wonders and beauties of starclouds, double and variable stars, nebulas and clusters.

After one has located the Northern Cross in Cygnus overhead at the time for which our chart is given, it is quite an easy matter to identify the other principal groups with the aid of the chart and Cygnus as a starting point.

Directly south of Cygnus is Aquila, the Eagle, with its first-magnitude star, Altair, about sixteen light years from the earth and one of the nearest neighbors of the solar system. Altair is always easy to find, as is Vega, with the aid of two fainter stars nearby. In the case of Vega two fainter stars form a small equilateral triangle with the brighter star, but with Altair the bright star lies in line with two fainter stars, one of the third the other of the fourth magnitude, and is about midway between them.



To use this map hold it over the head with top toward the north.

North of Cygnus are the two circumpolar groups, Cepheus and Draco, the head of Draco lying a little to the west of the meridian at this time and north of Hercules. The tail of Draco lies about midway between the bowls of the two Dippers. The Big Dipper is now far over in the northwest and is swinging downward toward the northern horizon. Cassiopeia, with its familiar "W," always to be found directly opposite the Big Dipper with the North Star midway between the two groups, is coming well into view in the northeast.

Hercules and Corona are still high in the western sky, but Boötes with its glorious Arcturus that we have admired on many a clear summer evening is now approaching the western horizon and will soon disappear from the evening sky.

In the east will now be seen that well-known configuration that is always associated with the fall season, as is Leo with the beginning of spring, the Great Square in Pegasus, with the three second magnitude stars of Andromeda adjoining Pegasus on the east, the most westerly of the three stars in Andromeda forming the northeast corner of the Great Square.

Turning toward the south we find that Scorpio with its brilliant red first-magnitude star, Antares, is disappearing in the southwest as Capricornus, the Sea-goat, and Aquarius, the Water-bearer, appear in the southeast. The most interesting constellation now visible in the southern sky is the brilliant zodiacal constellation of Sagittarius, always easily identified by its characteristic configuration, the little Milk Dipper with bowl inverted toward the south.

September 27 is the date on which Venus and Saturn will be in conjunction, Venus being at the time about three degrees south of Saturn. The planet Mars, which has been too close to the sun to be seen for some weeks, will be in conjunction with the sun on September 13. It will be at its greatest distance from the earth on September 4 when it will be about 247,800,000 miles away. The ruddy planet will next be seen before sunrise late in the fall.

On September 23, 1.44 p. m., Greenwich civil time, the sun will cross the equator going south in the constellation of Virgo. Autumn will then begin in the Northern Hemisphere and spring will begin its new reign in the Southern Hemisphere.

PHOTOGRAPH BY TIBBITTS

SOUTH FORK OF THE EEL RIVER

Giant redwoods of many centuries' growth border the stream. This is one of the tracts of original redwoods that the Save the Redwoods League is seeking to preserve for posterity.

Long Live King Sequoia!

By WALLACE HUTCHINSON

Of the United States Forest Service

MILLIONS of years ago, when the sabre-toothed tiger stalked the giant sloths in the open forests of the pre-glacial era, "King Sequoia" ruled over the entire northern portion of the earth. Then the glaciers came down—and retreated; the sabre-toothed tiger and his prey vanished from the face of the earth. But "King Sequoia"—the tree of the ages—lived on.

Today, due to changes in climate and other causes, the sole survivors of these once world-wide trees are confined to the State of California; one species, the Big Tree (*Sequoia washingtoniana*), occurring at moderate altitudes of the Sierra Nevadas, and the other, the Redwood (*Sequoia sempervirens*), growing along the west slope of the Coast Range that fringes the Pacific. These Sequoia forests are not only the finest in America, but the most magnificent the world has ever known, for the Sequoia is not only the oldest living thing on earth, but it is the largest and tallest tree on earth.

The naming of the colossus of the world's forests is a story worthy of record. Many years ago, there lived in this country a Cherokee Indian named Sequoya, one of the wonderful men of his race. It was he who invented, without aid, the Indian alphabet, which he taught to his tribe by writing the characters upon leaves. Sequoya was removed, with the rest of his tribe, from his home in the southern states and settled in the southwest; his death took place in Tamaulipas, Mexico, in 1843. When Endlicher, the celebrated Hungarian botanist, was preparing his noted synopsis of cone-bearing trees in 1846, Dr. Jacobson Tschudi brought the career of this remarkable literary genius to his attention and asked him to dedicate the redwood tree to his memory. Endlicher assented, and, in endeavoring to improve the form of the name, changed it to its present form of Sequoia.

The Redwood of the California coast, *Sequoia sempervirens*—the immortal Sequoia—is worthy of its name. Unlike its older and battered brother of the Sierras, the Redwood is a stately tree, the King

of the Forest. Scourge it with fire, and its thick bark scorns the dancing flames; cut it with ax and saw and it sprouts again with amazing vitality; dig out the stump and new shoots spring up from the spreading roots; pasture the land with cattle and in a few years the young sprout growth will shade out the grass. This capacity to reproduce itself by sprouts is a unique characteristic of the Redwood not possessed by any other conifer, and is the principal means by which the species perpetuates itself.

The range of the Redwood extends from Monterey north along the California coast to a point a short distance beyond the Oregon boundary, embracing an area of about 450 miles in length and from 20 to 40 miles in width. The narrowness of the range seems to be determined by the fogs which sweep in from the Pacific. In the southern part of this tree-belt the Redwood occurs largely in isolated groves, but in the northern counties of Mendocino, Humboldt and Del Norte it stands like an army, covering valley and mountain with a heavy panoply of green, and constituting the finest forests of the globe.

The age of mature Redwood, as determined by foresters from ring-counts, ranges from 400 to 1,300 years, and in many cases probably more. The diameter of the larger trees is from 15 to 25 feet, and the height from 200 to 350 feet. The amount of timber in one of these giants varies from 100,000 board feet to over 250,000 board feet, and there is an authentic record of a single acre of Redwood which produced 1,431,530 feet of lumber, or enough to build over 100 five-room bungalows. So dense are these superb stands that the sun's rays rarely penetrate to the forest floor, from which the giant redwoods rise, shrouded in the ocean mists, like the massive columns of some specter cathedral.

In the early Forty-niner days of California, after the gold rush, an unprecedented demand for lumber arose, and the Redwood, which had long exacted homage from man, attracted the attention of lumbermen, and logging soon began with the crude implements available in that early day. Plodding bull teams furnished the power for hauling the logs to the banks of the streams where they were left to lie, sometimes for years, until a flood of high water would carry them down to the sawmills on the coast. The butt logs of the larger trees were too heavy for the bull teams to handle, so it was the common practice to build a staging 10 to 15 feet above the ground for the cutters to stand on. Even the saws of those days were of insufficient length to cut through the sturdy boles and many a 10-foot Redwood was felled with axes alone.

But logging in the Redwood region did not long remain in a primitive condition. Bull teams soon gave way to donkey engines and logging railroads, while band-saw mills replaced the small circular-saw outfits. These in turn were supplanted by the "high lead," where powerful donkey engines haul in the logs on an endless steel cable operating through a giant pulley fastened 200 feet or more above the

REDWOOD YOUNGSTERS OF NURSERY AGE

Tiny sequoias growing in close nursery ranks for planting on the cut-over lands to assure reforestation with a new growth of the great trees.

ground on a "spar-tree." As the years passed, logging operations also moved northward from San Francisco Bay until they are now centered in the northern coast counties of Mendocino, Humboldt and Del Norte. Today, fully one-third of the original virgin stand of Redwood, estimated to have covered an area of 1,400,000 acres, has been combed with ax and saw, and the area of forest that is cut each year is in excess of 10,000 acres. On the remaining uncut lands are standing Redwood trees that contain more than 70 billion board feet of timber—enough to last for nearly 100 years at the present rate of cutting, and more than double the total annual lumber consumption of the entire United States.

For many years lumbermen gave little thought to the perpetuation of the Redwood or the permanency of their operations. The vast area of virgin Redwood forest, much of it unexplored, seemed inexhaustible, and most of the loggers were of the old school, who took what the land gave and moved on to new fields of conquest. Nature, in the meantime, made a valiant fight to reforest the cut-over lands, and many thousands of acres that escaped the ravages of repeated fires are today covered with a lusty second-growth of trees. But nature, unaided, could not perform this gigantic task, and, recognizing this fact, the lumbermen, with millions of dollars invested in sawmills and logging equipment, have "seen the light" and have come to realize that to perpetuate the Redwood industry they must also perpetuate the Redwood forest.

But it is only during the past four years that reforestation work has been undertaken on a substantial scale in the California Redwood region. Today, there are nine companies, which cut annually more than 70 per cent of all the lumber produced in the region, that are embarking on a tremendous business-like plan of reforestation, destined to restock all Redwood lands, cut over in the past or to be cut in the future, with a permanent growth of superior timber. Nine additional companies are also interested in reforestation and are investigating the possibilities of continuous forest production.

This Redwood reforestation problem is a large one, and has added interest and significance because of the fact that it is the first concerted movement on the part of any large group of lumbermen in the United States to translate the axioms of forestry into action. But the Redwood timber owners are

REDWOOD PLANTING CREW AT WORK

Ten to twenty men under a "straw-boss" work up and down hillsides in a regular line setting out young trees eight feet apart. The bushy stumps in the picture are redwood sprouts from the stumps of felled trees.

A NEW GENERATION OF REDWOODS

A second-growth Redwood forest of sprouts and seedlings, thirty to forty years old. Nowhere in the world will reforestation and fire prevention pay as in the redwood region.

not trying to solve all the problems themselves. They have employed a consulting forest engineer of note to work out the necessary plans of management; the Forestry Division of the University of California is assisting in experimental work, and nine of the leading companies have employed technically trained foresters to supervise field operations.

To understand the difficulties which confront the lumbermen and the forester it is necessary to know something of modern Redwood logging methods. A Redwood forest is logged in a manner distinctly different from that employed in any other timber stand in the world. All the trees are cut and the area burned-over in order to get rid of the mass of tops, bark (often two to three feet thick on the boles of mature trees), and the undergrowth and debris which cover the ground. These clearing fires are both hot and destructive, and if this method of logging were employed in a pine or spruce stand it would mean the complete extinction of the forest. But such is not the case with the Redwood. In a few months after the fire has burned itself out, and all the timber has been removed from the area, vigorous sprouts shoot forth from the blackened stumps and spread a mantle of green over the hillsides. Usually several hundred, and sometimes more than a thousand, of these "suckers" form a circle around the root-collar of the stump, and thereupon starts a battle-royal to determine which ten or a dozen will be the ultimate survivors. By the end of the first season the sprouts are several feet high, and in ten years they may be as tall as 35 feet.

On an average logged-over mountain slope the number of sprouting Redwood stumps varies from 10 to 25 per acre, or sufficient to reforest about one-third of the area. But this number of trees will not produce forest conditions conducive to the growth of tall straight tree trunks, free from branches and knots, which is necessary if high-grade lumber is to be secured. Nature must, therefore, be given a helping hand and the blank spots reforested by the planting of 500 or more little trees per acre. These man-made forests must then be given fire protection, for while there is a certain amount of truth in the statement that Redwood forests are "fireproof," this applies only to the stands of large mature trees, which with their thick bark are undoubtedly hard to kill. So, too, are the stumps from which the Redwood sprouts grow. But to the little Redwood seed-

lings fire is sure death. Realizing this, the Redwood lumbermen have incorporated in their reforestation plan an adequate system of fire detection and suppression which will protect the new forests until they reach maturity.

Most of the forest trees of the world, if given a fair chance, will reproduce themselves by natural seeding; but it is not so with Redwood. This giant of the forest produces a cone that is smaller than a walnut in size, and which contains a hundred or more minute seeds that are notoriously infertile. While all sizes and ages of trees produce cones in profusion, Redwood seedlings are exceedingly hard to find either in the forest or on cut-over land. Exhaustive experiments with seed collected from trees of all ages have, however, demonstrated that under the proper conditions Redwoods can be grown in a nursery as easily as any other forest tree. The results of these experiments have led the Redwood lumbermen to establish, in connection with their reforestation program, two large tree nurseries, one at Ft. Bragg, Mendocino County, and the other near Scotia in Humboldt County, each with a yearly capacity of more than 1,600,000 seedlings. It is the plan to produce at these two nurseries practically all the stock needed for field-planting operations.

Field planting in the Redwood region starts at the beginning of the California rainy season, usually in December, and continues as long as favorable weather conditions exist. When everything is in readiness for field work the little seedlings in the nursery beds are dug up, wrapped in wet moss, and made into large compact bundles for transportation to the planting camp, where they are placed in shallow earth trenches and taken up as needed. The usual Redwood-planting crew is made up of from 10 to 20 men in charge of a "straw-boss." Each man is given a mattock for digging the holes in which the little trees are set, and a canvas sack in which to carry the seedlings. The crew is then "strung-out" in a line with the men 8 feet apart, and work started from the bottom of the gulch up the mountain side. Each man digs his own holes and plants his own seedlings, using care to see that the fine roots are carefully spread out and that the loose soil is firmly tamped around the little trees.

It was in this manner that during the winter months of 1923–1924 and 1924–1925 a total of 3,800 acres of cut-over Redwood land was reforested. Next winter the planting program calls for the reforesting of 6,000 acres, and each year the amount will be gradually increased until the planted area will equal the acreage of virgin forest cut-over during that year. In addition to the area that is cut over each year, which must be reforested, there are about 90,000 acres of Redwood land cut in the past which will also require more or less planting to make it productive. This work will be undertaken as rapidly as the capacity of the nurseries can be increased to meet the demand for seedling stock.

What of the future? Will this reforestation program perpetuate the Redwood forests and the industry dependent upon them? Most assuredly, for the Redwood is the fastest-growing conifer in the world, and when the virgin timber has been entirely cut, which will be something like 100 years in the future, the second-growth stands, the sprouts and hand-planted seedlings of today, will be timber trees and ready for the ax. To those who are familiar with tree growth in less favored regions this will seem incredible, but here are the facts based on accurate measurements by foresters: Individual trees 50 years old, growing as sprouts from old cut stumps, have been found on favorable sites to measure over three feet in diameter and 160 feet in height. Not only are the individual sprout-trees large, but they form stands of astonishing density, varying in volume from 50,000 to 75,000 board feet, or more, per acre. Several such second-growth forests have shown a volume per acre of over 125,000 board feet, and there is one "wonder plot" on the banks of Big River, Mendocino County, that has produced on one acre, in 48 years, the stupendous total of 137,416 feet of lumber. Naturally, it is not to be expected that all second-growth Redwood forest will produce such yields, but it is safe to predict that the present-day sprout and man-made Redwood forests will, in 75 to 100 years, produce a greater volume of lumber than the average virgin Redwood stand of today. The reason for this is that the reforested lands will carry a fully stocked stand of timber, while the present-day virgin Redwood forest contains only a small number of trees of gigantic size per acre.

The first cutting of Redwood sprout-trees has already been made and boards sawed from the logs. The results, lumbermen say, are entirely satisfactory, since, while the lumber from such stands is not of as high quality as that obtained from the primeval forest, by the time these second-growth forests are ready for harvesting, say in about the year 2,000 A. D., the exacting standards of present-day consumers will no longer exist, due to the growing scarcity of the available timber supply throughout the United States. As one old Redwood lumberman expressed it: "If the people of this country don't wake up to the importance of the forestry problem to the nation and put our idle forest lands to working, the folks 100 years from now will be mighty glad to get most any kind of lumber."

Thus forestry has come to the Redwoods of California to assure the heritage of generations to come.

What Is Nature Education?

By E. Laurence Palmer

I OFTEN take visitors to Ithaca to Enfield Falls, one of the three new state parks. I do this partly for their entertainment and partly to watch their reactions to the experience.

An engineer who went to these falls with me exclaimed, "What a shame! There is all that wasted power." An artist merely watched the falls and made no comment, though his expression was more eloquent than words. A botanist complained, justly, that some most unusual plants had been destroyed in constructing the paths which come down through the gorge. For him the gorge had lost much of its attractiveness. A householder remarked, "Wouldn't this be a fine place for a house?" And a small boy commented on the concrete staircases that it wasn't one-half as much fun as it used to be before the dangers were removed.

All of these individuals were inspired to their remarks by exactly the same bit of nature. One can't help but wonder at the diversity of ideas which might be expressed by these individuals on a variety of subjects.

The writer undertakes to direct this section of Nature Magazine realizing that there will be an opportunity of bringing together and weighing the relative merits of ideas of many school people. There will be individuals who attempt to teach nature work from textbooks alone. Others will recommend no books, and still others will use a combination of books and nature itself. There will be individuals who will prefer the teaching of nature to children by specialists, and individuals who will recommend that the most satisfactory work in the long run will be that presented by those who are not specialists. Some will recommend that nature study should be taught as a separate subject and others that it be taught as a means of motivating other work.

The varied nature of these and of other viewpoints which are possessed by the readers of Nature Magazine cannot help but make this section interesting and useful to nature teachers if we can get expressions from them on these points.

It is not the purpose of this section to present definite subject matter for use in nature work. That aspect will be cared for by the remainder of the magazine. It is hoped, however, that during the year consideration may be given to such subjects as these: Nature Rooms and Nature Equipment; Nature Excursions; Nature Clubs; Organizations Which May Be Useful to Nature Teachers; Devices and Shortcuts for Use in Nature Education; Nature Work and the Common Branches of the Elementary Schools; Training Centers for Nature Teachers for Summer and Winter; Nature in Camps; Nature Dramatizations and Pageants; Recreational Methods in Nature Study. There will, of course, be many other topics which may be legitimately considered and some of these topics may easily be divided because of their broad application. There should be some consideration of the problems of the various geographical regions of the country; of the assistance which nature teachers can expect from either state authorities or from more local units.

A rather ambitious survey of what is actually being done in Nature Education in the country will also be conducted by this department. A definite outline of the program to be followed will appear in an early number. It is hoped that this will prove useful to teachers, principals, superintendents and other educators. Its value will, of course, be increased in accordance with the cooperation given the survey by those interested.

There will also be an attempt to submit some thought-provoking activities in this section. For the last few months I have been preparing "Practical Nature Puzzles" dealing with a varied number of nature subjects. It is perfectly possible to continue these puzzles for a considerable time, but I am dropping them from this section for a few months at least so that we may know whether or not they have proven useful. If there is any considerable demand for their return, they will, of course, begin to appear again, possibly in a more limited space, if that seems desirable.

This month I wish to ask an expression of opinions on the relative merits of a few types of work. A certain New York State rural school had a boy in it who drew cartoons. There are, no doubt, many such boys in the United States. This boy had been brought up on a farm and had planted corn. His teacher asked him to draw a series of cartoons illustrating the life of corn. The unillustrated result was as follows:

"1. I am sitting in the dark down here in the ground. It is the last of May and I am just planted. I hope the weather is nice when I get up there. I will make up lost time.

"2. Oh! Oh! just look. I am at last through the ground and there is a crow after my sisters and brothers. I hope that he will not see me. Here's where I have to grow fast to get out of his way.

"3. Here I am just about ready to be cut and picked of my nice ears. I hope it will rain, for the ground is quite dry. And I have rolled my leaves tightly to keep the sun from evaporating all the moisture from me.

"4. Well, I am cut and set up with my brothers and sisters. We were so squeezed that I can hardly breathe. I hope this doesn't last long.

"5. I am just picked from the stalk, a great big ear of corn. I have all the room I want now, but it is pretty lonesome. I wonder what became of my twin brothers.

"6. Boo! I am all naked and just

about frozen to death. They took all of my clothes and threw me in this queer place with slats up the sides. I was glad to find a lot of my relatives. We snuggled up together and managed to live. I do think they might finish putting the sides on. O, mercy! there is a little dark animal nibbling on my well-filled end. What ever shall I do?

"7. The farmer came to see us the other day and he threw us that had been nibbled in a pile. He said we were only good for chicken feed. So into this car we went and are now taking a ride.

"8. Here I am being fed to the chickens and all because of that nasty little black creature, who spoiled my shape and made the man think I wasn't the best ear that ever lived. Well, chickens, I hope you like me and lay big fat eggs so I can be good for something after all. If it weren't for crows and mice how happy all us corn would be."

Was this nature study, or was it not?

Another school teacher asked the students to bring spiders into the Nature Study class. These spiders were supposed to be studied by the students, and evidently they were, as is indicated by the following account:

"We were asked to bring spiders to the Nature Study class. After I put the spider in a bottle I decided to put in the egg sack that was in the web. I put some moist sand in the bottom of the bottle. After a few days I thought the web looked different. At first I thought it must be the particles of sand on it, but upon further investigation I found it to be baby spiders.

"The next day, October 6, there were one hundred twenty-five spiders. The number gradually diminished until on October 23 there were only six babies in the web, but there was a new egg sack. Only four baby spiders were living on October 24 and all had disappeared October 31, but on the latter date there was another egg sack, thus making two new sacks.

"One of the egg sacks started to hatch November 5. At first I counted fifty baby spiders, the next day seventy-five, and the eighth day there were eighty baby spiders. On the ninth five had either died or been eaten.

"Only twenty babies were alive on the twelfth day, fifteen were alive the fourteenth day, fifteen the fifteenth, eight the nineteenth, five the twentieth, and all had disappeared by the twenty-eighth day, which was December 3.

"The mother spider was fed live flies almost every day during this time. She seemed vigorous and quite content to live in a bottle. The dirt in the bottom of the bottle was kept moist. Sometimes she would eat the flies while we were watching her, but generally she would wait until we were gone.

"I put the bottle in a large aquarium so that she would have more room to run about. December 14, she had started to spin a web in the aquarium. This was the first time we had seen her outside of the bottle.

"When I returned after my vacation for the holidays on January 9, the mother spider was dead, but I hope the egg sack will hatch."

A third school presented in pantomime a dramatization called, "The Big Bad Bold Barbarous Barberry Bush." In this dramatization we first saw a girl with flaxen hair busily kneading bread at one side of the stage. A second child, well covered with branches of a barberry bush, stood on the other side. A third child dressed in black carried red chalk dust from a pail on the barberry bush to the girl making the wheat bread and sprinkled it over her. This was continued, and the bread-making gradually slowed up because of the supposed invasion of the red rust for which the barberry was partly responsible. At this point a scout entered and chopped down the barberry bush so that it no longer was a source of supply for the wheat rust. The result was that the wheat supply revived and the girl who represented it continued the making of bread. She handed the scout some cookies, and of course the play ended happily. It is admitted that there may be some scientific discrepancies in the plot. Would you expect, however, that the children who witnessed the dramatization would have learned effectively about the relation between wheat rust and barberry? Might this result in a reasonable and profitable activity on the part of the child?

If so, was it worth-while, and did this sort of thing have any place in nature study work? It might be added that, in a number of schools where this has been tried, children wrote pantomimes and plays of their own, some of which may appear in this section if they are desired. If there is a sufficient demand for this sort of thing, NATURE MAGAZINE stands ready to publish a collection of dramatizations, pageants and the like.

It is hoped that any individuals communicating to the Nature Education section will make it a point to provide the director with the information suggested in the following questionnaire:

"I teach nature study as a means of motivating other work.

"I teach nature study as a separate subject.

"I teach nature study to all classes at once.

"I teach nature study to separate classes.

"Nature Study may be taught to all grades at once around a common topic, such as the value of woodpeckers. In some classes different unrelated topics are used for the different grades, as birds for the first grade, flowers for the second grade, mammals for the third grade, and so on. I follow the first of these methods. I follow the second of these methods."

I have frequently been asked to state my definition of Nature Study. I have always felt that definitions of this sort must necessarily be subject to change as time goes on. For the purpose of getting an expression of opinion from readers of this section on the matter I am willing to submit the following definition for your consideration. Nature Study is intended to represent a type of applied education designed to encourage an understanding appreciation of the natural environment in which we live, and to do this in such a manner that we will enjoy cultivating those faculties in us which lead to the best habits of living.

It will be the purpose of the Nature Education section of the NATURE MAGAZINE to aim to help the readers attain the ideals suggested in this definition. It is admitted that there will be readers who may resent the term "applied education" on the grounds that education is not education unless it is applied. Others may resent the insertion of the word "understanding" before "appreciation" on the grounds that real appreciation implies understanding. In spite of these objections which will probably be raised, I am willing to leave them in, at least for the present.

It is my personal view that nature education should find its place eventually in the work in reading, writing, arithmetic, geography and the other more or less departmentalized fields of education. This will not in any way for a long time interfere with the necessity of specially trained nature teachers in school systems. It may merely give these teachers a greater responsibility towards the more orthodox school activities than many of

them have at present. This increase in their usefulness should not prove a handicap to them or to the administrative authorities to whom they may be responsible.

The new aspect which appears in the Review section conducted by Mrs. Peeples is due to the fact that I feel there should be a closer relationship between nature work and the more standardized activities.

For the present, at least, it is my plan to apportion these four pages of NATURE MAGAZINE on this basis: One page will be devoted to a leading article by some individual prominent in the work. A second page will be devoted to a consideration of some aspect of nature work, with the question raised as to whether or not that aspect is worthy of support. A third page will be devoted to a forum chosen from the correspondence arising from this section, in which the viewpoint of individuals interested will be presented. It is hoped that this article may start some expression along this line and that in the near future there may appear a discussion of the most interesting point raised. The fourth page of this section will be devoted to Mrs. Peeples' review of the subject matter material in NATURE MAGAZINE, with suggestions as to how it may be used in school work.

Nature Study Review

Suggestions for the use in Nature Study of the articles in this issue of NATURE MAGAZINE

By ELIZABETH K. PEEPLES

Teacher in Charge of Nature Study, Washington, D. C., Schools

Cutie, a Prairie Pet Here is a story for little folks, so well illustrated and giving so much detail regarding the peculiarities of a prairie dog, that a lesson for primary pupils could be built upon it without other foundation. Live material, however, should be studied first wherever possible. After observation and discussion of the creature's appearance, characteristics, and habits, read the story, "Cutie, a Prairie Pet," to the class. In localities where prairie dogs are not found, the lesson will naturally follow one upon a familiar relative like the squirrel. Back numbers of NATURE MAGAZINE supply similar material for lessons on other rodents as follows:

The Wit of a Red Squirrel, March, 1925; The Carolina Gray Squirrel, May, 1925; The Flying Squirrel, April, 1924; The American Beaver, April, 1925; Johnny and Paddy, Two Baby Beavers, January, 1923; The Furry Muskrat, July, 1925; The Eastern Deermouse or White-Footed Mouse, October, 1923; Points About Porcupines, January, 1925; Dinty, a Pet Porcupine, March, 1924; The Friendly Porcupine, February, 1923.

* * *

Notable Fishes of the Sea Any youngster so fortunate as to have explored a nearby brook for its fish, or even fortunate enough to have seen those of the locality in an aquarium or museum collection, after becoming familiar with the characteristics of typical fish, will be fascinated by this description of the "freaks of Nature" which inhabit deep sea waters. Fish which are blind because eyes are useless where there is no light, fish which carry their own lanterns, fish with elastic stomachs capable of containing a neighbor twice the size of the stomach's owner, a lady fish who so distrusts her husband that she keeps him tied permanently to her apron string, so to speak, fish with flat bodies of every conceivable shape, fish with spikes in place of scales, fish which inflate themselves to look like balloons, fish encased in coverings of hard shell, and fish which are camouflaged and lie in wait for their prey populate a water world of 319,000,000 cubic miles as marvelous as fairyland. There are seven pictures illustrating the text. Children will enjoy collecting others after reading it. They will equally enjoy looking for other "freaks of Nature," such as the mantis with its deadly forelegs, the twiglike walking stick, the damsel flies which frequently fly tandem, the nut and acorn weevils with mouth parts at the end of a long beak, and a host of others all of which, though more familiar, are no less strange examples of the effect of environment and habit upon structure than the deep sea fishes.

* * *

The Sentry of the Shallows With the help of illustrations and museum specimens, children who have no opportunity to study the great blue heron in his native haunts or in a zoo may, nevertheless, learn to count him among their bird acquaintances. Having accumulated a background of knowledge, junior high school pupils should be allowed to read "The Sentry of the Shallows" for the pure joy of it, as one reads a poem. Later the more gifted members of the class may attempt word pictures of outdoor scenes which have impressed them, after the manner of the descriptions in the second paragraph; or they may be asked to try to portray some historic event as vividly and picturesquely as the author does the mediaeval hawking party. "To disturb nature's system of checks and balances is to invite sure penalties." This statement, amplified by the account of the breaking levees following upon the killing of the heron sentries, offers indefinite opportunity for research, thought, and discussion. Another proposition for personal investigation is this, "Individualism is as marked among birds as among men, if our dull eyes could see the evidence." Pupils should observe and compare their experiences in class.

* * *

Some Reptiles of Panama This article takes us to Panama, and may be effectively used not only in supplementing the study of our native reptiles, but in introducing the geography or history of that country to the small boy, since it presents a subject, hypnotic in its appeal to him—snakes! A good beginning makes a good ending. Start with some local snake, lead on through snakes here discussed and leave off, if you like, with the building of the Panama Canal. The account here given of the Colonel Watres Expedition for the Everhart Museum introduces the crocodile of

Panama, lizards, the boa constrictor, coral snake, and fer-de-lance. It closes with an amusing comment on the immemorial exaggerations of those who report encounters with snakes, attributing the inaccuracies to fear. An interesting language lesson might be based upon exaggerations of local interest such as hoop-snakes, milksnakes milking cows, and the like. Most people are fascinated by museum collections of snakes, even though they may "hate" them in the open, a fact which shows that the antipathy is caused by fear, often ill-grounded since many snakes are *harmless*.

* * *

Murre Multitudes In the use made by murres of their none-too-perfect equipment for life lies the secret of their success; and herein is a lesson of perennial value to young and old. There is keen philosophy in the comment made regarding the pengiums of the South Arctic, "they walk along like foolish people, with their heads in the air, without a thought that some day they may have use for wings." Though not remarkable in flight, awkward on foot and producing in a season only one chick to each pair, murres are the most populous diving birds of the sea living beyond the shore line, because they are "swift of purpose and bent upon business." This lively description of life in a murre colony transports the reader to "sea-girt rocks" where the very basalt and granite are warmed by the mothering multitude. The formation of the cliffs used by these birds as nesting places fits naturally into the geography course. Though the only murres available may be stuffed specimens in the museum, or those pictured with this article, Junior High School classes should include them among the birds studied.

* * *

Long Live King Sequoia! Whether as a part of his personal experience, or as a marvel to be read and dreamed of, every child should know the Sequoia, "the oldest living thing on earth" as well as "the largest and tallest tree." His acquaintance with it may be of the close-up or long-distance variety. In either case this article will increase his knowledge and broaden his interest in "the tree of the ages," which once ruled over the entire northern portion of the globe, but which is today confined to the State of California. The present range of the Big Trees and Redwoods, the origin of the name Sequoia, a description of the Redwood forests and the lumbering methods employed in them, and an account of Redwood reforestation; "the first concerted movement on the part of a large group of lumbermen in the U. S. to translate the axioms of forestry into action," constitutes a history of one of our greatest natural resources that should be familiar to every American of ten years and over. California's unselfish vision, which has rescued this heritage of our people from destruction, should be adopted as the national viewpoint on problems in conservation.

To draw to scale a map of California showing the range of the Redwoods will prove a valuable project in geography, detailed information for which can be found in paragraph five.

The author gives many figures which may lead naturally to arithmetical computations. Let it be remembered, however, that such correlation must be the spontaneous outgrowth of the child's interest. Nature Study is not a drill subject, and should never be forcibly used as such.

Fieldbook of Nature Study

To the teacher who does not teach nature study because of the fact that specific information about various creatures is not quickly available, the new Fieldbook of Nature Study, by E. L. Palmer, Comstock Publishing Company, Ithaca, New York, should be most useful. The information is presented in tabular form and is chosen on the basis of types of actual questions asked. The information covers over 500 different birds, mammals, trees, herbs, insects, fish, amphibia, reptilia, mollusca, crustacea and the like. If the teacher knows the name of the creature described or presented by a pupil, information about the creature may be quickly secured through an index. If the name is not known, it may be ascertained through reference to plates of illustrations, many of them by Louis Agassiz Fuertes. In addition there is an outline suggesting appropriate material for the various grades covering all this material. There is also a sheet of material useful in satisfying the demand for manual exercises in cut-out and color work. The material has been voted the most satisfactory type of assistance by approximately 10,000 teachers who have had opportunity to use it in connection with other material.

Answers to August Puzzles

The answers to the Practical Nature Puzzles given last month are as follows: Horned toad, 3; tree-climbing lizard, 2; glass snake, 4; gila monster, 1; horned toad, 5; fence lizard, 6; gila monster, 7; land turtle, 9; alligator, 9; snapping turtle, 11; box turtle, 10; painted turtle, 12; sea turtle, 14; tortoise, 15; mud turtle, 13; glass snake, 18; alligator, 16; tortoise, 17; alligator, 19; tortoise, 20; 21–8; 22–10; 23–4; 24–6; 25–13; 26–5; rattlesnake, 28; black snake, 30; coral snake, 29; 30–27; tree climber, 32; ground, 31; copperhead, 34; garter snake, 35; green snake, 33.

Practical Nature Puzzles will continue to appear in NATURE MAGAZINE if you let it be known that they are desired.

MAKE THAT "DREAM HOME" COME TRUE!

What romance there is in creating a home! Long before the walls actually begin to rise, you can have the thrill of building the home in imagination, let it rise before you—the pleasures of anticipation—the satisfaction of knowing, when you begin to build, that you have provided everything, that you have made your home, in fact, the "Dream Home."

It means much to you to have your home right, for you probably will build but once in your life-time. If you want real success in your new home, then make a study of home building—and what better way is offered than with Keith's, a magazine coming to you every month with a real message, with new ideas, a magazine of national reputation through whose columns you can pick up bits of valuable information as you go along. Study home building even before you buy your lot. Do not wait until you are ready to build. Make a beginning now.

For those, who are ready to build, there are many reasons for taking Keith's. It will help you to decide on the type of home; on the kind of exterior finish; on the materials for its construction; the interior arrangement; its decoration and furnishings. Keith's is a magazine that tells how to secure the many conveniences to be had. It is a magazine that will inspire and encourage you, a magazine that will help you to successfully meet the various problems and answer questions which arise. It is a magazine well established, and for over 25 years has helped home builders and home owners, who have found its practical, skillful suggestions worth hundreds of times its small cost.

A special feature of the January, February, March and April issues of Keith's will be the showing, in each number, of 32 plans for small homes. Throughout the twelve numbers of Keith's you will receive nearly 200 plans of artistic homes, including suggestions for two-family houses and garages.

"Beautiful Homes"

A complete home builders' book, handsomely illustrated with plans of 200 homes, showing the latest architecture. Gives you examples of all types of construction for the bungalow, cottage and two-story home.

Special Two-for-One Offer

The subscription price of Keith's Magazine is $3 per year, single copies 25c, at news stands. But for a limited time, we make this offer—to send you Keith's Magazine for one year, together with Keith's De Luxe Plan Book—both for the cost of one, $3, plus mailing cost on the book.

Think of the opportunity which Keith's makes possible for you to secure a copy of this big De Luxe Plan Book. Let us give you, now, the advantage which you would get from an immediate visit to these 200 selected homes.

KEITH'S
MAGAZINE
– on Home Building

MAIL THIS COUPON

KEITH'S, *Dep't 113, 100 N. 7th St., Minneapolis, Minn.*

☐ Send me Keith's Magazine for one year, also your 278-page De Luxe edition, "Beautiful Homes," postage prepaid, for which I enclose check [or money order] for $3.25.

☐ Send me as above C. O. D. for which I agree to pay the postman, upon delivery, $3, plus a few cents postage.

Name .....

Address .....

City ..... *State* .....

Why Brand's Peonies are the World's Best

Brand's Peonies, justly celebrated the whole world over, are grown from a long list of prize-winning plants, the blooms from which have received many awards.

Most notably is the award of the American Peony Society, of a Silver medal and two Gold medals at one National Show, an achievement gained by no other grower.

Brand's Peonies captured the three highest prizes at the greatest National Peony Show ever held, and with the keenest of competition.

Wherever exhibited, Brand peonies are almost invariably prize winners. Brand peonies took the first prize at the Northwestern Peony Show, the next largest show to the National Peony Show. The Grand Sweepstakes prize at the St. Paul Peony Show was taken by Phœbe Cary, a Brand peony.

Surely, with records like these back of the plants, you will want some of this stock, which includes the following choice varieties:

LeCygne; Solange; Lady Alex. Duff; Tourangelle; Longfellow; Luetta Pfeiffer; President Wilson; Mme. Jules Dessert; Kelway's Glorious; Therese; Frances Willard; Martha Bulloch; Jubilee; Judge Berry; Walter Faxon; Phoebe Cary; Kelway's Exquisite; Richard Carvel; Mary Brand; Sarah Bernhardt; and many others.

WE ISSUE TWO CATALOGS

Our Peony Manual, which we consider the most complete and up-to-date work ever written on the Peony, a 64-page book that tells all one wants to know of the varieties, the culture, and the history of the Peony, we make a charge of 35c, which sum may be deducted from the price of your order for Peonies when sent in. We also issue a smaller catalog and price list of Peonies and Iris giving varieties and full descriptions. This small catalog is free. We advise that you order early before stocks of varieties are broken.

Growers of Peonies for More than 50 Years

THE BRAND PEONY FARMS

Box 26, Faribault, Minn.

YOU CAN GROW BEAUTIFUL FLOWERS FERNS PLANTS

By Using ZENKE'S

"New Plant Life"

(LIQUID)

1 Teaspoonful in 1 quart of water when watering plants.

MANUFACTURED BY
THE EXCELL LABORATORIES
4535 Ravenswood Ave.
CHICAGO

At your Florist or postpaid, one pint can 60 cents

FIFTY GLORIOUS PEONIES

Send for list

ISAAC S. HENDRICKSON

Flowerfield

Box C Long Island, N. Y.

TULIPS, NARCISSI, PEONIES

In many standard varieties and some novelties. Also **Snowdrops** and **Stars of Bethlehem.** Send for complete list of specials. All postpaid. Peonies, 7 plants, all different, $2.00; 3 for $1.00. Tulips, mixed Darwin, $2.80 per 100; Clara Butt, $3.20: 50 of each, $3.00.

ORONOGO FLOWER GARDENS, Carterville, Mo.

SEND US YOUR FILMS

Special Trial Offer. Any size Kodak film developed 5c, prints 3c each. Trial 6x10 Enlargement in handsome folder 40c. Overnight Service. **Roanoke Photo Finishing Co., 370 Bell Ave., Roanoke, Va.**

E-M-L-O-N-G-'S
Gorgeous
TULIPS

Our big fields of Tulips are the brightest spots in Michigan during the blooming season. You, too, can enjoy these most beautiful of all flowers next spring, if you will plant a bed or border to our healthy, hardy, Michigan grown Giant Darwin Tulip Bulbs. American grown bulbs will bloom a week to ten days earlier than imported Holland bulbs.

SPECIAL BARGAIN OFFER

20 Big Bulbs $1.00 100 Big Bulbs, $4.00

Postpaid anywhere in U.S.A.

These collections are composed of our very finest varieties of Giant Darwins, tall, stately stems, assorted colors. Planting instructions included with each order assures your success.

HENRY EMLONG & SONS

BOX 6A STEVENSVILLE, MICH.

"SOME LEAVES ON AUTUMN PLANTING"

A booklet with natural color pictures, money-saving offers and Fall planting helps

Just say, on a postal, "Send Booklet N"

Moons' Nurseries

THE WM. H. MOON CO.

MORRISVILLE PENNSYLVANIA

which is 1 mile from Trenton, N.J.

City Forest Worth While

Albany can cash in to the extent of about $50,000 on its municipal forest, according to the New York State Conservation Commission, and not in any way injure the forest. A survey of this area, which was recently set aside as a city forest and watershed for the municipal water supply, shows that there are about 3,500 pitch pines suitable for piling and pier construction that can be thinned out with benefit to the forest. In addition there are some 2,000 cords of wood that could be cleared out. The sale value of these assets is about $50,000. This spring 50,000 three-year old Scotch pines were set out on the tract. In addition to having this asset from the timber point of view, the area is extensively used as a recreational ground.

Snake Immigrants

Although no quota has been set by the Government for snakes a number of snake immigrants arrived at New York recently and have settled down at the Bronx Zoological Park under the expert influence of Raymond L. Ditmars. These new arrivals add remarkably to the already fine collection at the snake house. They include the rhinocerous viper, gaboon viper, boomslang, and giant black cobra. There are several of each except the rhinoceros viper and a number of young were born en route. The new arrivals were transferred from the ship to the zoo without mishap.

Seeds for Europe

Although the crop of Douglas Fir and Sitka Spruce seeds is about one-fourth of normal, Mr. Charles Lathrop Pack, president of the American Tree Association, has obtained seeds of both trees in considerable quantities to be sent to Europe. These seeds, as in former years, will be planted for the reforestation of devastated and denuded areas, where actual warfare destroyed the timber growth or the insistent demands of conflict made extensive cutting necessary. The seeds will be sent this year to Great Britain, France and Italy. Already the seeds from previous similar gifts have grown into youthful trees, and thousands are pushing their way up in forest plantations on the former front in France.

PLANT PEONIES NOW!

The Most Splendid Flower in Cultivation!

OUR selection of varieties gives four weeks of flowering season in June, rare fragrance, delicate and gem-like color, and great masses of enormous blooms. Our collection is one of the largest in the world, comprised of over a thousand varieties. We guarantee all our Peonies—true to name.

YOU can get in cut flowers and in landscape effects greater results from the Peony than from any other flower. Always hardy. Free from insect pests. When you plant Peonies you plant for permanency. Make your selection of these wonderful Peonies at the prices given on this page and mail your order today.

OLD GARDEN COLLECTION

Should be planted by the entire nation—vigorous growth and lots of bloom

Edulis Superba, Mauve Pink.....$.75
Souv. de l'Ex. Universelle, Violet Rose .75
Rubra Superba, Crimson..... .75
Meissonier, Cherry Red..... .75
Madame de Verneville, White..... .75

$3.75

The entire collection for $3 postpaid

MOTHER'S COLLECTION

Here's the flawless exquisite collection for the artistic taste

Albert Crousse, Shell Pink.....$1.00
President Taft, Blush Pink..... 1.00
Linne, Cherry Red..... 1.00
Monsieur Dupont, White..... 1.00
Couronne d'Or, Snow White..... 1.00

$5.00

The entire collection for $4 postpaid

WONDER COLLECTION

A revelation of Peony beauty in variety of best colors

Albatre, Milk White.....$1.00
Andre Lauries, Tyrian Rose..... 1.00
Atrosanguinea, Rosy Magenta..... 1.00
Claire Debois, Satiny Pink..... 1.00
Dorchester, Hydrangea Pink..... 1.00
Felix Crousse, Ruby Red..... 1.00
Jeanne d'Arc, Tricolor..... 1.00
Jules Calot, Rose Pink..... 1.00
La Rosiere, White..... 1.00
Venus, Sea Shell..... 1.00

$10.00

Any 6 for $5, or the entire collection, 10 Peonies for $8 postpaid

WORLD'S BEST COLLECTION

A supreme collection for colors, fragrance and size

Germain Bigot, Lilac Rose.....$1.50
James Kelway, Exquisite White..... 1.50
Lady Alexander Duff, French White.. 5.00
Monsieur Jules Elie, Lilac Pink..... 1.50
President Taft, Hydrangea Pink..... 2.50
Sarah Bernhardt, Apple Blossom Pink 2.50
Welcome Guest, Silvery Pink..... 2.00
Reine Hortense, Soft Pink..... 2.50
Lafayette, Salmon Pink..... 3.00
Mons. Martin Cahuzac, Purple Garnet (the darkest peony in existence).... 3.00

$25.00

This entire collection selling at $25 will be mailed postpaid to any address for $20

DARWIN TULIPS

The Long Stemmed Varieties

Bartigon, Fiery Clear Red
Baronne de la Tonnaye (Caliope), Bright Rose
Clara Butt (Appleblossom) Soft Salmon Rose
La Tulipe Noire, The Real Black Tulip
Pride of Haarlem, Brilliant Scarlet Salmon
Reverend Ewbank, Silvery Heliotrope

1 dozen any variety 75c. 3 dozen any variety $2.
The entire collection, 6 dozen for $3.75 postpaid.

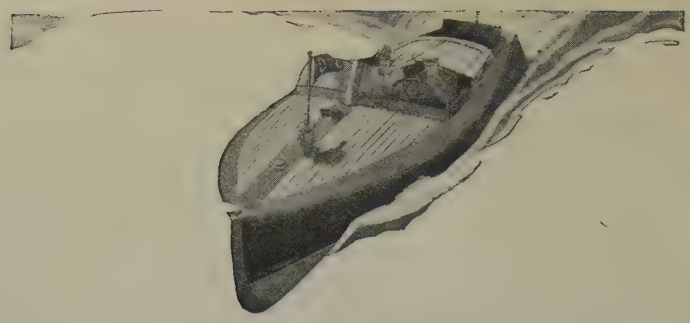
"Peonies for Pleasure"

A beautiful booklet de luxe. A great treat for every Peony admirer. Gives you beautiful, life-like views of our entire line and provides an accurate guide for ordering. Gives facts and helpful cultural directions. Our price list contains the most complete list of Peonies in the world, ranging in price from 75c to $100.00 each.

THE GOOD & REESE CO.

"The House of Service"

Dept. 7 **Springfield, Ohio**



From Miami to the Lakes of Maine

For the added convenience of our customers along the eastern seaboard we refer to our New York offices at
393 Seventh Avenue
1210 Equitable Life Bldg.

WHEREVER fancy takes you a Hacker Dolphin runabout will lend itself to your every whim. Glorious days on open waters hold forth an added zest to those who love the wind and sun and the buoyant feeling of thrilling flight. But you must ride in a runabout to experience what this sheer enjoyment of life holds forth.

In the Hacker Dolphin fast runabout the united efforts of seasoned designers, skilled boat builders and experienced marine engineers have produced a finely co-ordinated boat that is comfortable to ride in and dependable for a trip of any length. Built to meet the demands of absolute safety, the Hacker Dolphin can be easily operated by any member of the family

BELLE ISLE - HACKER *Boat Sales Co.*
DISTRIBUTORS
DETROIT
Sixty-three hundred East Jefferson Ave.

Two Things Every Boy Needs

333 **Camp Axe--No. 9**

Dandy to take on hiking trips, in woods or to the camp. 2⅞ in. x 4¾ in. blade of finest steel, 14 in. handle of selected hickory. Can be carried in the belt. $1.50 Leather sheath, 75c.

Woodcraft Knife

Boys who want a good knife like this one. Curved blade of finest steel, sharp point,—back of blade checkered to give firm grip Leather handle, with sheath, $2.25. Stag handle, $3.00.

If dealers can't supply you order by mail, sending money order.

MARBLE ARMS & MFG. CO.
569 Delta Ave., Gladstone Mich.

GO HUNTING FISH CAMP fun

There is fun ahead of the nature lover who wants to get out in the open in an

"AUTO-KAMP" TRAILER

Here, indeed, is an ideal way to enjoy the outdoors or to tour South this winter. The "Auto-Kamp" trails any car easily, and is equipped for the safety, comfort and convenience of four adults and two children. A regular home on wheels. On display at Marshall Field, Chicago; Strawbridge & Clothier, Philadelphia; Kaufmann's, "The Big Store," Pittsburgh; T. J. O'Neil & Son, Columbus; J. C. Goss, Detroit, and the Factory. Write for specifications, prices and opinions of users.

AUTO-KAMP TRAILER CO.
4518 Sheridan Ave. Saginaw, Mich.

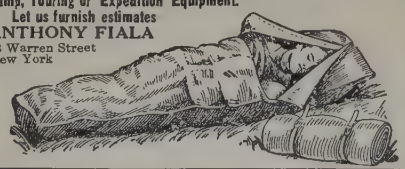
Fiala Patent Sleeping Bags

"Without doubt, you have the best light-weight bag on the market."—DR. C. P. FORDYCE
Scientifically Correct

No dead air spaces to absorb moisture and odors. Every part can be sunned or washed. Weighs 5 lbs.; warm as 30 lbs. of blankets. No hooks, strings or crude contraptions.
Write for circulars

Mirakel 5x Prism Binoculars; genuine Jena; Explorers 5 oz. with case $22.50
Fiala high-grade .22 cal. combination rifle and pistol, with 3 barrels. A $30 rifle at $18

Hensoldt's Portable Microscopes and Binoculars
Camp, Touring or Expedition Equipment.
Let us furnish estimates
ANTHONY FIALA
23 Warren Street
New York



For Your Boat

Elto Ole Evinrude's New Quick Detachable ROWBOAT MOTOR

Easily carried. Quickly attached to any boat (without tools). Drives boat any speed, 2 to 10 miles per hour. No rowing, no work, no bother.

Fast—Light—Powerful
Easy to Carry

Has 12 exclusive features, all described in our new Free Catalog. Write for it today.

Elto Outboard Motor Co.
Manufacturer's Home Bldg.
Dept. 61
Milwaukee, Wis.

(14)

The Motor that Starts with a Touch

ASK YOUR FRIENDS TO READ NATURE MAGAZINE

GIVE NATURE MAGAZINE AS A BIRTHDAY PRESENT

Many Plants Found

About 10,000 plants were brought back from Chile and Peru by Dr. Francis W. Pennell, curator of plants at the Philadelphia Academy of Natural Sciences, after some six months in the South American countries. The expedition was made in behalf of the Philadelphia Academy, the New York Botanical Gardens, the Field Museum of Natural History in Chicago, and Harvard University. The specimens will be divided between them. In the field of Dr. Pennell's own specialty, the Scrophulariaceae or snapdragon-foxglove family, many interesting and new specimens were discovered.

Cooperation

The following is a quotation from C. P. Russell, Park Naturalist of Yosemite National Park, in the museum notes of the *Yosemite Nature Notes Bulletin:*

"The American Nature Association has presented 'Animal Life in Yosemite' in pictures to the Yosemite Nature Guide Service. These unusually interesting animal pictures were made by the noted nature photographer, William L. Finley. Never did birds and mammals behave more entertainingly than have these subjects of Mr. Finley's. His black bear cubs must have reserved their antics for weeks to have put so much vigorous fun into so short a length of film. The intimate glimpses of mountain lion kittenhood are on a par with the interesting bear cub episodes. 'Teeter-tail,' the Sandpiper and 'the original St. Vitus Dance' put on by the water ouzel furnish most amusing and instructive glimpses of the behavior of these Yosemite natives.

"The pictures are received with great enthusiasm by the large audiences to which they are shown by the Yosemite Nature Guide Service. The generous cooperation extended by the publishers of NATURE MAGAZINE in making this film available to Yosemite visitors is indicative of their sincerity in furthering the nature study idea."

Plant Congress

Plans are finally shaping for the convening in Ithaca, New York, in August, 1926, of the International Congress of Plant Sciences, covering botany, bacteriology, horticulture, agronomy and forestry. It is hoped to assemble there the most eminent scientists of the world engaged in plant study.

GERMAN ARMY OFFICERS'
FIELD GLASSES
FREE TRIAL

8 power $9.85 If you wish to keep them

Free trial coupon will bring you these genuine German War Glasses purchased at exceptionally advantageous rates of exchange.

Manufactured by most prominent of German optical factories. Many were received direct from the Allied Reparations Commission. Conservative $20.00 value.

Finest achromatic day and night lenses. 40 m.m. objective. Dust and moisture proof. Pupillary adjustment. Built for service, regardless of cost, according to strictest military standards. All glasses guaranteed in perfect condition. We have sold 60,000 pairs of this model to date.

Shipped promptly on receipt of attached coupon on 5 days' free trial. If satisfied send check or money order for $9.85. *Order your field glasses today.*

HENDERSON BROTHERS

Largest importers of field glasses in America

97 W. Federal Street Boston, Mass.

FREE TRIAL COUPON

Gentlemen:

Please send me on 5 days' free trial one pair German Army Officers' war glasses. After 5 days' trial I will either return glasses or remit $9.85.

Name _____

Address _____

State _____

NAT. 1

MIRAKEL
VEST POCKET
BINOCULARS

WIDE FIELD

An ideal companion for your outing

Light in weight, easy to carry, impervious to dust and hard usage, yet still possessing all the fine optical qualities of the most expensive glasses.

The individual eye adjustment rectifies differences between the eyes, bringing both into perfect focus. When once correctly adjusted, these glasses are in ADJUSTMENT FOR ALL TIME, and in proper focus for 20 feet, 20 yards, or 20 miles.

Excels for practical everyday use among those who travel, fish, hunt, hike or motor.

$22.50

Complete with Leather Case and Strap or Soft Suede Pouch

MIRAKEL DISTRIBUTORS

1214 16th St. Washington, D. C.

In writing to the advertisers on these pages, you will find it of value to mention NATURE MAGAZINE.

Making Use of Parks

If there be any lingering doubt as to the public appreciation of our National Parks, early figures on travel into them will quickly dispel this doubt. In the Yellowstone National Park, for example, 527 automobiles entered the park on July 7, 25 more than entered the park on the record day last year. The total travel for that part of July tabulated showed a gain of 2,773 over the same period last year, and gains were registered in every classification of travel into the park.

Herbarium Important

"The making of an herbarium covering the trees of the world and showing their distribution is the work which should now occupy the chief attention of the Arboretum," says the bulletin of public information of the Arnold Arboretum of Harvard University at Cambridge. "It should not be long delayed, for many species of trees are bound to disappear as the earth's surface is cleared for the cultivation of food crops for the human race, and especially as the production of rubber to meet the demands which are made on it by the increased and rapidly increasing number of automobiles now in use. Such a world-wide exploration will require many years to accomplish, possibly a century, and will cost a great deal of money."

For the Wild Flowers

Preservation of wild flowers has become a matter for official governmental activity in more than one state. Further evidence of this is found in the bulletins printed by the states pointing out the vital need of preserving the wild flowers and seeking to educate the public into an appreciation of them sufficient to leave them for others to enjoy. The latest addition to this literature is an attractive bulletin written by Dr. E. M. Gress of the Bureau of Plant Industry of the Pennsylvania Department of Agriculture.

BUY AT WHOLESALE!

Save ⅓ to ½!

"Marchand"

Full Acromatic

Ocular Lenses

$6.75

A rare value for the sport and nature lovers! A limited number of brand new genuine "Marchand" Bird Glasses at an enormous reduction in price. 19 ligne or 1¾-inch diameter objective lenses and big ocular eyepieces. Extreme brilliancy of illumination, large field and sharp definition. Magnify 4 times. No color aberrations. Guaranteed brand new and perfect. Size closed 3½ in., extended 5 in. Complete with case, cord and shoulder strap. Sold regularly, everywhere, at $15.00 and up. Special sale price now, $6.75.

SEND NO MONEY

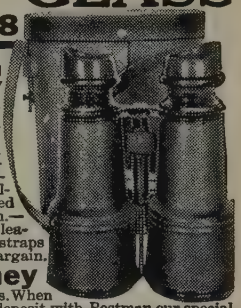
We'll send these genuine "Marchand" Bird Glasses on this liberal trial offer. Order by letter or postcard, now. Send no money. When glasses arrive, pay postman only $6.75 plus postage. Then put these glasses to every test you know of. Take them with you on your pleasure trips. Compare them for efficiency, value and price with those your friends have or those YOU can buy ANYWHERE else. After 10 days' trial, if you are not delighted with your purchase, send the glasses back and we'll refund every cent you paid. No risk to you. Send your order today while this special offer lasts.

Free catalog showing hundreds of other models, all sold direct by mail at big savings. Send for it today—no obligation.

NEW ERA OPTICAL CO., DEPT. 1456, 17 NO. WABASH AVE., CHICAGO, ILL.

FIELD GLASS

Genuine Chevalier only $6.98



Amazing value, imported French Air Force, Army and Navy field glass. See distant objects as if they were close. Wonderful glass for nature study, races, hiking, touring and all sports. Powerful achromatic lenses, 21 ligne objective, large field, strong illumination. Special shaped eye pieces. Opens 7½ in.—closed 6½ in. Handsome leatherette case and shoulder straps included free. A life-time bargain.

Send No Money

Send only name and address. When field glasses are delivered deposit with Postman our special low price of only $6.98 plus postage. (Regular $15.00 value) case and straps included free. Satisfaction guaranteed or money refunded. Send at once. Bargain Catalog FREE.

FERRY & CO., 3224 N. Halsted, Dept. 9456, Chicago

Geneva Binoculars

"Brings the view close to you."

Finest glasses the money will buy

A glass for every use and every pocketbook

4 to 20 Power

$9.50 to $106

Every glass sold on 10-day trial and guarantee of absolute satisfaction or money back. Get the Geneva price list first.

Send for descriptive Circular Today

GENEVA OPTICAL CO., 39 Linden Street, GENEVA, N. Y.

3 Ft. Telescope

5 SECTIONS

8 POWER LENSES

Free Handsome 12 in. leatherette **Carrying Case** with strap sent **free** with Wonder Telescope for short time. Wonder Telescope gives new pleasures to home, farm, camp, travel, sport. See people and objects miles away, on land or sea, as if they were close. See moon and stars as never before. Opens out over 3 feet long, in 5 sections; measures 12 inches closed. Brass bound; powerful lenses. Entertain your friends day or night. Thousands pleased. Be first in your neighborhood.

Send No Money Send only name and address for Wonder Telescope with FREE Case and Strap. On arrival deposit with Postman $1.85 plus few pennies postage. **Satisfaction Guaranteed** or deposit refunded. Order now.

Ferry & Co., Dept. 1456
3224 N. Halsted St. Chicago, Ill.

'I am delighted with the 'Wonder' telescope. Today I have been watching submarines 3 miles off the coast." Wrote Philip Brush, Beverly, Mass. "I am very much pleased with telescope. I saw a Light House 18 miles away."—Clyde Scribner, Taunton, Mass. "Far above my expectations. Can see men working 7 miles away."—S. M. Gearhart, Bolan, Iowa. "I could see a wind-mill on a farm across a lake more than 4 miles away. I am much pleased."—Raymond Cosanova, Hudson, Wisconsin.

Thousands Delighted

"I have had my 'Wonder' Telescope 6 months. I can tell time on the Edw. church clock 5 miles Foster, long away." — Baltimore, Md. telescope "Could tell color of aeroplane 4 miles away." — Mrs. L. M. Yarbrough, Stringer, Mass. "Read numbers on freight cars mile away. See mountain on moon."—A. C. Palmer, Indianapo... "Watch my boy arrive at school, 2 miles away."—Mrs. Horn.

Magnified 225 Diameters

This is what the tip of a fly's leg is like when seen thru the

Ultralens Microscope

At last the high powered microscope is within the reach of all who wish to study, observe and experiment with the vast world of minute objects that are invisible to the naked eye. A remarkable discovery enables us to manufacture the Ultralens Microscope (magnifies 225 diameters) for **one-eighth the usual cost.**

$7.50
for Complete Outfit, prepaid

EASY TO USE

Any amateur can immediately start using his Ultralens to examine the edge of a razor, the mesh of a cotton shirt, the bacteria in dirty water. No technical training required, yet hundreds of scientists and teachers are using this instrument today. It is at once interesting, instructive, and scientific. Gives enormous magnification and perfect definition.

COMPACT

The Ultralens Microscope comes packed in a beautiful Leatherette case with full instructions that any one who can read can understand. Lenses of 125 x and 325 x objectives can be furnished at $1.50 each.

ORDER TODAY

Order direct from this advertisement and get your Ultralens Microscope now. Fully guaranteed. If, however, you desire more information before purchasing we will gladly send free descriptive catalog.

SCIENTIFIC APPARATUS CORP.

Dept. 205 **MILTON, PA.**

Baltimore Oriole

Pictures—7x9 inches

Dodson Bird and Nature Pictures

Send for them!

The loveliest color pictures in existence—made from the famous MUMFORD plates, accurate and authentic! Order these beautiful color picturesof the birds, flowers, fruit, animals, minerals, etc. They create enthusiasm for the beautiful things of nature. You'll need them this fall. Ideal for school-room or home.

Send fifty cents for 17 pictures, complete list of 650, and Mr. Dodson's fascinating catalog "Your Bird Friends and How to Win Them."

Joseph H. Dodson, Inc.
911 Harrison St. Kankakee, Ill.

Birds! Birds!

We can supply for immediate shipment all varieties of Pheasants, Wild Ducks, Geese, Swans, Cranes, Peafowl, Wild Turkeys, Canaries, Parrots and Cage Birds.

Ship Anywhere—Safe Arrival Guaranteed

TWIN BROOK GAME FARM

Box 44, Middletown, N. J.

Feed the Birds

Put out
THE PACKARD
Automatic Food-House

Keeps the food dry; feeds automatically; avoids waste; lasts years; weighs a pound and a half.

$1.00 each—Why Pay More?

SPECIAL MIXTURE BIRD FOOD

A balanced ration; best for the birds; best for use in the food-house

1 pound 25 cents—10 pounds $2.00

Everything for Wild Birds

Catalogue Free

WINTHROP PACKARD
1433 Washington Street **Canton, Mass.**

ANIMALS AND PLANTS
For the Laboratory, Aquarium, Vivarium or Museum

Living and preserved specimens of all types for Nature Study, Biology, Physiology and related subjects

Catalogues and information free upon request

Southern Biological Supply Co., Inc.
Natural History Building
New Orleans, La.

Shumway's "Pedigreed" Bulbs

All Guaranteed Blooming Size

My contracts with the Holland growers specified ***largest sizes.*** Therefore in ordering from me you are assured the ***choice*** of their stock.

Plant bulbs in quantity this fall for a gorgeous display of radiant blooms next Spring. For your consideration I have selected a few of the outstanding varieties of Darwin and Breeder Tulips.

Name	*Color*	Price per hundred
Pride of Haarlem	Rose Carmine	$4.50
Clara Butt	Salmon Pink	4.25
Zulu	Almost Black	4.25
Dream	Delicate Lilac	4.50
Bartigon	Carmine Crimson	5.75
Baronne de La Tonnaye	Vivid Pink	4.50
Golden Bronze	Golden Hue	5.00
Cardinal Manning	Rosy Violet	5.00

Special collection of above:
800 bulbs—100 of each . $35.00
400 bulbs— 50 of each . 18.00

Superfine Collections
Largest Size Bulbs

	Varieties	*100*	*50*
Darwin Tulips	12	$3.75	$1.95
Breeder Tulips	10	4.00	2.10
Cottage Tulips	8	3.50	1.85
Crocus	5	2.50	1.30
Narcissus	5	5.00	2.75

All Prices Include Transportation Charges to Your Home

Illustrated catalog lists a great variety of Tulips, Narcissi, Hyacinths, Crocus, Peonies, Lilies, etc. Sent free on request. Write for it today.

R. H. SHUMWAY, Seedsman, Dept. D, Rockford, Ill.
(Established 1870)

Ritemor PRINTED STATIONERY $1.00

200 SHEETS, 100 ENVELOPES

Printed with your own name and address (4 lines or less) in rich, dark blue ink. Fine texture *Hammermill Bond* paper, smooth and beautiful. Sheet size 6x7, **extra heavy** envelope to match. Shipped in attractive box, postpaid. Denver West add 10 per cent. *Remit with order*, money refunded if not fully satisfied. Remember, there is only one **"Ritemor"**, known everywhere and preferred by thousands. Order now.

RITEMOR STATIONERY CO.
214½ N. Alabama St. **INDIANAPOLIS, IND.**

Art Corner Your Pictures—Album

where you can keep them safe and enjoy them always.

Engel

5 Styles "Art Corners" 5 Colors

are on sale at Photo Supply and Album counters everywhere. They are the only Quick, Easy, Artistic, No Paste, No Fold way to mount Kodak Prints. A dime brings 100 and samples to try. Write

ENGEL MFG. CO.
Dept. 19 W4711 N. Clark St., Chicago

10¢ Buys 100

Nature's Silent Call

"There comes a time in the yearly life of every man and woman who has not become too calloused to disregard it, an urge 'to get up and go,'" says Wilborn J. Deason in "Nature Silent Call," published by the Bunting Publications, Inc., Waukegan, Illinois. "We may call it spring fever at that time of year or we may call it the effect of Indian summer in the autumn; but twice yearly everyone has that strange feeling—that innate, that intuitive, that inherent force of all Nature calling to the inner man. It is the silent call that bids us migrate to some quiet place in the Great Out-of-Doors to seek rest and quiet." The volume is the result of the wanderings and observations of one who answered this call and found Nature in the quiet places.

Lives of Wild Fowl

Literature on the wild fowl of North America is enriched by the recent publication by the Smithsonian Institution of Bulletin 130 entitled "Life Histories of North American Wild Fowl." This is the work of Arthur Cleveland Bent, of Taunton, Massachusetts. It is the fifth of a series of bulletins on the life histories of North American birds, the preceding volumes having covered the diving birds, gulls and terns, petrels, pelicans and their allies and a part of the order covered in the present volume. Mr. Bent's work, which fills three hundred pages of type and is richly illustrated, is the result of long and arduous work, the sacrifice of a scientist and naturalist to his deity, Nature. It is a distinctly valuable volume, copies of which may be had from the Superintendent of Documents in Washington at the ridiculously low price of ninety cents a copy.

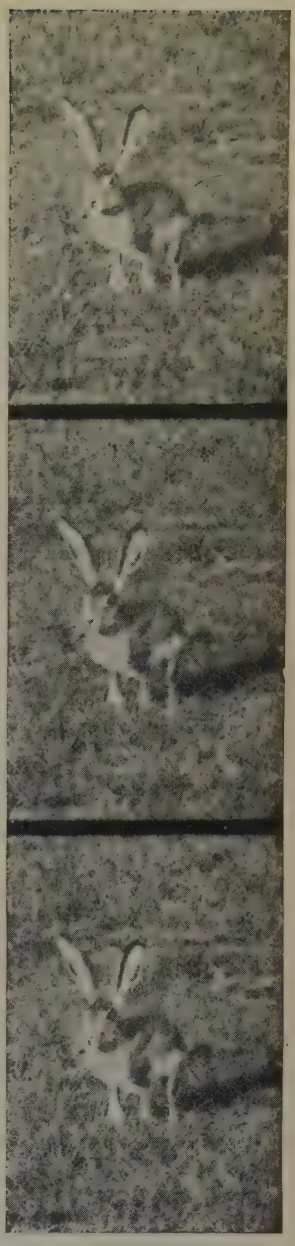
Walking with Nature

"With the remarkable growth of interest in walking as a means of outdoor recreation and for the study of Nature, which has been displayed in the last few years, there has come a demand for some sort of guidebook by means of which the busy city dweller may make the best use of the precious hours —all too few—when he escapes the thraldom of office, shop and factory," says the introduction to The New York Walk Book. This little volume, which is the work of Raymond H. Torrey, Frank Place, Jr., and Robert L. Dickinson, proceeds amply to fill this demand for the area more immediately adjacent to the metropolis. The book is richly supplied with maps and travel information for the walker. It is published by the American Geographical Society.

Filmo

Filmo Automatic Motion Picture Camera in use on a light tripod.

Photos shown here were reproduced in recent issue of NATURE MAGAZINE in connection with interesting write-up by a Filmo user.



Photograph made with a FILMO Motion Picture Camera, Reproduced by Courtesy of NATURE MAGAZINE.

"Shooting a Hobby"

The nature lover who sees no reason for destroying life for sport's sake can still enjoy shooting as his choicest hobby. But the shooting will be done through a lens instead of a rifle barrel, and the game will be exhibited pulsing with all its original life and action—not dead and cold.

This kind of shooting is made easy by the FILMO motion picture camera. It sights like a spy glass. Weighs about the same as a still camera of post-card size. Has wide range of flexibility to cover poor lighting and distant subjects. Its spring motor always provides uniform power at the touch of the button.

And when you get home, your pictures which the FILMO automatic projector throws on the wall or screen at any lighting socket will be clear and flickerless—of the standard seen in the best theaters. Naturally, for the FILMO Outfit is made and backed by the pioneer manufacturer in the professional field—now producing over 95 per cent of all the studio motion-picture cameras and equipment in use.

The cost of shooting your own motion pictures is surprisingly low. The pleasure is incomparable. If your dealer hasn't the FILMO, write today for our booklet, "What You See You Get."

For ordinary close-up work the FILMO Camera may be used without a tripod. Simply hold in a natural sighting position, touch the button, and "what you see you get."

ESTABLISHED 1907
BELL & HOWELL CO.
1825 LARCHMONT AVE.
CHICAGO
BRANCHES NEW YORK HOLLYWOOD

Nature Entertainments

Illustrated by

AUTOCHROMES (DIRECT COLOR-PHOTOGRAPHY), MOTION PICTURES, HAND-PAINTED SLIDES

Seven distinct programs now available—Trees. Birds. Flowers. Rocky Mountain National Park. Bird Songs and Wild Flowers. Trees and Woods-folk. Autochrome Studies.

Imitation bird calls by natural whistling

"The exactness of the imitations was astonishing."—*Pueblo (Colo.) Star-Journal.*

GUY C. CALDWELL

(*Of the American Nature Association*)

Official Guide in the Rocky Mountain National Park

"I have received many fine comments on your lectures given us while in York. Our City Supt. of Schools, Dr. R. O. Stoops, says it was the best investment the school board made. While in this community you spoke to 7,000 persons including the Woman's Club. We shall long remember with pleasure this illustrated talk."—H. C. Ulmer, Exec. Sec., York Co. Conserv. Soc. (Pa.).

For terms, etc., write direct to

GUY C. CALDWELL, Long's Peak, Colo.

Winter address: 1214 16th St., Washington, D. C.

Linen Prints of 12 Rocky Mt. flowers, $1.60

ROSE HAVEN SCHOOL

Health, Education, Happiness

Children 4 to 10 years of age

Kindergarten and Primary grades

8 Miles from N. Y. C. Phone Dumont 177

Box N. M.

Tenafly, New Jersey

STUDY AT HOME

Directed by

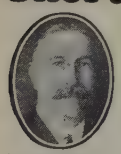
The University of Chicago

Courses in English, History, Chemistry, Business, Mathematics, Education, Psychology, and 35 other subjects command credit toward a Bachelor degree. Begin any time. Address 33 Ellis Hall, University of Chicago, Chicago, Ill.

WANT WORK AT HOME?

Earn $18 to $60 a week RETOUCHING photos. Men or Women. No selling or canvassing. We teach you, guarantee employment and furnish WORKING OUTFIT FREE. Limited offer. **Write today. ARTCRAFT STUDIOS Dept. C. 3900 Sheridan Road, Chicago**

Short-Story Writing



One pupil won a $2000 prize. Another pupil earned over $5000 in spare time. Hundreds are selling constantly to leading publishers.

Particulars of Dr. Esenwein's famous forty-lesson course in writing and marketing of the Short-Story and sample copy of THE WRITER'S MONTHLY free. **Write today.**

Dr. ESENWEIN **The Home Correspondence School** **Dept. 61** **Springfield, Mass.**

YOU CAN OIL PAINT

Amazing new method teaches men or women to earn after first lesson. OIL PAINT photos at home ---portraits, landscapes or art subjects. Earn $18 to $100 and more a week. FREE OIL PAINT OUTFIT. Graduates furnished employment. Send now for free illustrated book.

PICTORIAL ART STUDIOS, INC.

Dept. J-04, 2731 No. Clark Street, Chicago, Ill.

Looks Like a Real AUTOMATIC $1.98

Protect yourself from toughs and hold-up men. Most amazing automatic 4½ in. long; gun-metal finish. Can't tell from real atuomatic until you pull the trigger and presto! you have Opera Glass, Pocket Mirror, Magnifying Glass, Telescope, Reading Glass, Mirror, Sun Dial, Compass, etc. Loads of fun! useful, instructive. A real protector

MAKES 10 USEFUL ARTICLES

Send No Money Just send name. On arrival of "Automatic" deposit with Postman $1.98 plus a few pennies postage. Satisfaction guaranteed or deposit refunded. Supply limited. Order now. Big Bargain Catalog sent FREE. **FERRY & CO., Dept. 9456, 3224 N. Halsted St., Chicago, Ill.**

SCHOOL INFORMATION

FREE catalogs and expert advice on ALL Boys' or Girls' schools or camps in U. S. Relative standing from *personal inspection* Bureau maintained by the Schools and Camps themselves. No fees. Call, write or phone

AMERICAN SCHOOLS ASSOCIATION
1212-N. Times Building
New York
or 1204 Stevens Bldg., Chicago

Make Money In Photography!

We train you quickly at home. No experience necessary. Spare time or full time. Photographs in big demand by magazines, newspapers, advertisers, etc. Portrait Photographers make more money today than ever before. Commercial Photography also pays big money. New Plan. Nothing else like it. Write today for details and new FREE book, "Opportunities in Modern Photography."

International Studios, Inc.

Dept. 1676 **3601 Michigan Ave., Chicago, Ill.**

Save 1000 Steps

—with this wonderful new invention. A combination Tea Table and Service Wagon of 101 uses. Better than a maid—invaluable when entertaining—useful at all hours—lightens labor—saves time. Large top, 3 deep shelves, extra glass tray, 2 handles, silent swivel wheels, generally useful, handsome. Endorsed by leading magazines. FREE Picture Pamphlet and nearest dealer's name on request. SPECIAL—Write for Factory Offer where we have no dealer.

Combination Products Company
Dept. N-9, Cunard Bldg., Chicago, Ill.

Make Furniture at Home

It's easy and will give you lots of fun. Just follow the simple instructions in Popular Mechanics Home Furniture Making Books. Make any article of Mission furniture you want—tables, chairs, stools, davenports, electric wall lamps, and many other useful and beautiful pieces of furniture. Crystal clear instructions in 2 handy books; 240 pages, 139 illustrations. Simply follow directions and you'll be surprised with your good results. Sell the furniture or keep it.

Send No Money Write a postal now asking that Popular Mechanics Home Furniture Making Books be sent you C. O. D. When the postman delivers books, simply hand him $1.98 plus few cents postage. **Money refunded if not delighted.**

POPULAR MECHANICS PRESS, Room 509, Chicago, Ill.

6½% UNITED FIRST MORTGAGE BONDS

Selected Security

First Mortgages on Detroit apartment and office buildings — appraised and *carefully selected* — are behind United First Mortgage Bonds.

For many years thousands of "United" investors have realized the maximum return on their money consistent with the absolute safety assured in these bonds.

Write for our interesting book. In it you will find the opportunity you have been waiting for.

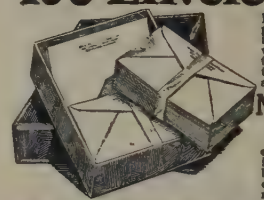
UNITED STATES MORTGAGE BOND CO. LIMITED

Howard C. Wade, President

340 U. S. Mortgage Bond Building
Detroit, Michigan

---

200 Sheets 100 Envelopes $1.00 POST PAID



High grade, clear white bond paper—unusually smooth writing surface. Size 6 x 7 inches with envelopes to match. Has that crisp, crackly "feel" that identifies it to everyone as superior quality stationery.

Name and Address Printed Free

on every sheet and envelope in rich dark blue, up to 4 lines. Type is Plate Gothic, designed especially for clearness and good taste.

Makes a personal stationery you will be delighted to use. An ideal gift with your friend's name. Attractive 3 letter monogram if preferred.

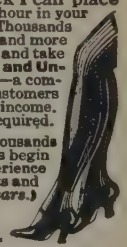
Just send $1.00 (west of Denver and outside U.S., $1.10) and this generous supply of stationery will come by return mail, postage prepaid. Securely packed in a sturdy blue box. Please write or print clearly. Prompt service and satisfaction guaranteed or money refunded.

National Stationery Co., 1456 Lincoln Highway, Batavia, Illinois

---

I Want 700 Agents At $90.00 a week

Men and Women! Write me today and by this time next week I can place you in a position to make $2.00 to $5.00 an hour in your spare time, up to $15.00 a day full time. Thousands of our representatives are making that and more with our **New Plans.** Simply introduce and take orders for famous **World's Star Hosiery and Underwear** sold direct from mill to home—a complete line for whole family. Permanent customers and repeat orders make you steady, big income. No delivering or collecting. **No capital required.**



Write Quick It's a chance to make thousands of dollars. Your profits begin at once. Exclusive territory. No experience needed. Write today and I'll send all facts and tell how to start **Free.** *(Established 29 years.)*

World's Star Knitting Co.
1459 Lake Street Bay City, Mich.

Take Advantage of This Unusual Opportunity

Volumes I, II, III, IV and V of NATURE MAGAZINE have been bound into four attractive books, with dark-green cloth cover and gilt lettering.

Containing a wealth of fascinating articles about birds, animals, fish, reptiles, plants, insects, trees and other phases of nature, they provide a vast storehouse of interesting information.

Order these unique books today.

Volume	I,	$10.00 postpaid (rare)
Volume	II,	3.00 postpaid
Volume	III,	3.00 postpaid
Volume	IV,	3.00 postpaid
Volume	V,	3 00 postpaid

American Nature Association

1214 16th St., Washington, D. C.

21 Jewel ~ Extra thin
STUDEBAKER
The Insured Watch
A Lifetime Timepiece
Sold direct from the factory at a saving of 50%.
SENT FOR
$1.00
DOWN!
Only $1.00! The balance in easy monthly payments. You get the famous Studebaker 21 Jewel Watch—insured for a lifetime; 8 adjustments, including heat, cold, isochronism and 5 positions—choice of 60 new Art Beauty Cases in green gold, white gold or yellow gold effects. Latest thin models.
Chain Free! For a limited time we are offering a beautiful Chain FREE!
Write For FREE Book
Send today for wonderful Studebaker Book of Advance Watch Styles and our $1.00 Down Offer—FREE!
STUDEBAKER WATCH CO.
Dept. V93 South Bend, Indiana
Canadian Address: Windsor, Ontario

The EVANSHIRE
In Chicago's Most Beautiful Suburb
EVANSTON

Surface, elevated and steam transportation lines, a block distant from Hotel Evanshire, make fast time to Chicago's "Loop." Thus the Evanshire has the convenience of location of a Chicago hotel in the environment of Chicago's wealthiest and most beautiful suburb. Charges are moderate, although in equipment, service, environment and class of patronage the Evanshire holds highest rank.

The Evanshire is at Main and Hinman Streets, not far from glorious old Lake Michigan. European plan. Rates are from $3.00 a day up for one person and $5.00 up for two, all rooms have private bath. Write today for illustrated folder.

Save your copies of
NATURE MAGAZINE
Let the Nature Binder help you do this. Bind them in handsome, dark green covers.
Nature Binder Department
AMERICAN NATURE ASSOCIATION
Washington, D. C.

Questions and Answers

The American Nature Association will be glad to answer such questions as its members ask about Nature.

QUESTION: *I have just caught two baby crows and want to make the most of them. They have been feeding on table scraps, but do not seem fond of anything in particular. What should I feed them? Also I have heard that a crow can be taught to say a few words by splitting its tongue. Is this true?*—R. H. J.

ANSWER: Crows are not discriminating in their diet and will be satisfied and thrive on scraps. The splitting of a crow's tongue to make it talk is an ancient and false belief. The crow talks with its throat, not its tongue.

QUESTION: *If you take a wolf pup and tame it and it is perfectly tame and gentle up to the time of its maturity, will it always remain tame and not turn on you without warning as a bear would?*

ANSWER: A wolf pup brought up in surroundings of gentleness will be as safe as a dog, but the animal must not be teased, beaten or badgered in any way. It will be a one-man pet. The reason that the animal brought up tame loses its gentleness is generally the intervention of some outside intruder who teases or plays with the animal in some unaccustomed way, exciting its nerves. This applies to a bear as well as a wolf pup.

QUESTION: *This spring, while walking through the woods, I saw a bird about the size of a bluebird or robin with bright black wings and bright red body. Its voice was loud and very pretty. What kind of a bird was it and is it found much in the Catskill Mountains?*—G. H.

ANSWER: There is no doubt that you saw in your walk through the woods a male scarlet tanager. It is a valuable bird for farm and woodland, feeding upon insects that eat the leaves of the trees, particularly the oak. The bird is about seven inches long, the male being as you describe it in season. The female is greenish above; yellowish below, with darker and brown-tinged wings and tail. The male in autumn is much like the female, except that it retains the black on wings and tail. The eggs are light greenish-blue with brown and purple markings. The scarlet tanager is found all through eastern North America and southern Canada as far west as the plains. Its southern and winter migration is to northern South America.

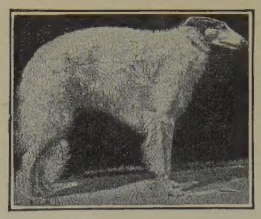
FREE
canary call
with each
Junior CANARY FOOD KIT
2 canary Highballs
Enjoy your canary to the utmost by keeping him healthy and singing. That is what the contents of Kaempfer's Junior Canary Food-kit will do. The Highballs give exercise and prevent hunger. The Birdolene is a well-established song stimulator. Send in your 56c today. We mail this Food-Kit postpaid and include FREE—the Canary Call and a booklet on "The Care and Treatment of Canaries."
PKG. of Birdolene
Address Dept. G
56¢
KAEMPFER'S
30 E RANDOLPH ST.
CHICAGO

Learn to Mount Specimens like These
BE A TAXIDERMIST
Learn at home by mail to mount and stuff birds, animals, game-heads, fish—tan furs and skins and make fine rugs and robes. Wonderfully interesting and fascinating. Easily, quickly learned in spare time. Save your trophies. Decorate your room and home with finest of art. Make taxidermy your hobby.
Old reliable school—75,000 graduates. Success guaranteed. Big profits. Sell your mounted specimens and mount for others. Big demand for the work. Have a business of your own. Earn money in spare time for athletic goods, guns, traps, radio, books and vacations. A great opportunity. Grasp it. Write today.
FREE Beautiful illustrated book, "How to Mount Game." Explains the secrets of taxidermy. Dozens of photos of mounted specimens. Tells how you can learn and earn. Every one who fishes, hunts, or likes outdoor life should have this great book. Just send your name and address. Write today. No obligation.
Northwestern School of Taxidermy
1456 Elwood Building Omaha, Nebraska

Attract Wild Ducks! Fish! Animals!
To your property. Make it valuable and pleasant. Wild life will come, if you provide food. Plant Wild Rice, Wild Celery, Water Lilies—35 other varieties; something suitable for every condition. 28 years' practical experience. Write today for expert planting advice.
C·B·T
TERRELL'S AQUATIC FARM
47 W. BLK. Oshkosh, Wis.

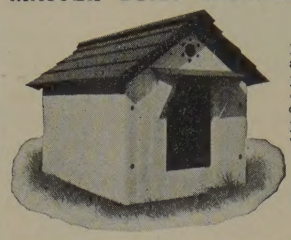
New Design Colonial Solid Brass Bird Cage
Valued at $12.00. Our special introductory price is $6.00. We pay the postage. Your money back if not satisfactory. Only a limited number will be sold, so send your order at once.
AMERICAN CAGE CO.
514 18th St., Racine, Wisconsin

In The Kennels



RUSSIAN WOLFHOUND PUPPIES
bred from the very best imported strains. Puppies ready for shipment.
Prices reasonable.
Catalogue Ten Cents
Arkansas Valley Kennels
D. C. DAVIS, Prop.
Dept. N, Cimarron, Kans

Sunnybank Collie Kennels
Pedigreed collie pups for sale; grandchildren of my book-heroes, TREVE and BRUCE and LOCHINVAR BOBBY. Registered stock. Ideal chums and playmates and show-prospects. Buyers must come up here in person, as I will not ship young puppies by express. Prices $75.00 up—usually UP. (At Stud, Champion Sunnybank Sigurdson, fee $35.00; Sunnybank Explorer, etc., fee $25.00.)
ALBERT PAYSON TERHUNE
Pompton Lakes, N. J.

MASTER BUILT SANITARY KENNELS

Make Happy, Healthy Dogs
May be cleaned, aired and sunned in a jiffy.
Four standard sizes or special sizes to order.
Best material and workmanship.
Send today for Circular "J"
Master Kennel Builders
Basking Ridge
New Jersey

"Strong Heart" Police Dogs

Champion Bero of Elmview
"Character plus Appearance." You can pay more but you *can't* get a better dog.
SUN BEAM FARM
STRONG HEART KENNELS
R. F. D. 10
New Brunswick
New Jersey

Help *Your* Dog
to be a happy, cheerful companion. You will find, at every Drug Store and Pet shop, GLOVER'S IMPERIAL DOG MEDICINES for every dog affection and our book, sent FREE, will tell you many things you should know about your dog.
Write, address Dept. DW3
H. CLAY GLOVER CO., Inc., 119 Fifth Ave., N. Y.
GLOVER'S
IMPERIAL MEDICINES

FOR **YOUR DOGS and PUPS**
Feed the BEST—That's
Perfection Dog Food

Insist upon Perfection at your Pet Shop, Sporting Goods or Feed Stores or order our Special Introductory Offer of 5 lbs. at 75c or 10 lbs. at $1.25 Shipped, prepaid, anywhere in U. S. Literature FREE
PERFECTION FOODS CO.
Post Bldg., BATTLE CREEK, MICH.

DELCREO DOG REMEDIES
Each a specific in the treatment of MANGE, ECZEMA and Other Skin Diseases
Kill fleas and other vermin
FREE KENNEL MANUAL
Dept. 52, DELSON CHEMICAL CO.
42 Penn Street . . Brooklyn, N. Y.

"DOG AND BLACK FOX INSURANCE"
Policy Covers Death from Any Cause, Theft and Loss by Escape
LOWEST RATES
LLOYD'S NATIONAL UNDERWRITERS
PEORIA, ILLINOIS

Dog and Black Fox Insurance
Covers any loss anywhere
Most liberal Live Stock Policy
Lowest Rates 100% Coverage
Lloyd's Insurers, Chicago, Ill.
6751 Sheridan Road

Membership Nomination Blank

American Nature Association Washington, D. C.

ANNUAL DUES
United States $3.00 a year
Canada . . . $3.50 a year
Abroad . . . $4.00 a year

....., 1925

Secretary, American Nature Association,
1214 16th St., Washington, D. C.

I nominate for subscribing membership in the Association and to receive NATURE MAGAZINE:

.....

Address.....

.....

Name and address of
Nominating Member .....

.....

90% of the annual dues is designated for subscription to the magazine

THE TREE-PLANTING ARMY

Nation-Wide Tree-Planting Plans by Scouts, Girl Reserves and Schools Now Getting Under Way

Four big tree-planting campaigns open this fall. Plans for a state-wide tree-planting campaign in Texas have been completed. J. W. Stayton, of *Holland's Magazine* of Dallas, expects that thousands of new tree planters will be enrolled in the Tree-planting Army as a result of the campaign in the schools of Texas. This is one of the biggest campaigns outlined to the American Tree Association.

Another big drive on this fall is the planting by Girl Scouts of the United States in honor of Juliette Low, the founder, on Founder's Day, October 31. Troop leaders are now sending for the tree-day programs and tree-planting instructions to the American Tree Association. Mrs. Calvin Coolidge, the honorary head of the Girl Scouts, is a member of the American Tree Association, she having planted the Oberlin College Elm on the grounds of the Lincoln Memorial in conjunction with the world-wide tree planting by the graduates of that Ohio institution. The Association sends every tree planter, who fills out its free application blank, a certificate of membership as was given Mrs. Coolidge.

"We expect to go into every school in the state," said Mr. Stayton. "This is a five-year proposition with us." The place to begin an educational campaign is with the coming generation, according to Charles Lathrop Pack, who urges a town forest for every community in the state planted by the citizens of the community. He has ready for distribution to city planners and clubs *Town Forests*, that tells just how to go about starting a town forest. A great opportunity is presented Texas.

Edith M. Sankey, of the Center County, Pa., Fair Association, reports the planting of 5,000 trees on its grounds.

Plans are being made for the Girl Reserves of the Y. W. C. A. throughout the nation to plant trees. A call will go out to the reserves for tree planting in honor of Grace Dodge and Florence Sims, and new thousands enrolled in the Tree-planting Army.

Minnie J. Nielson, superintendent, Department of Public Instruction of North Dakota, reports plans for a tree-planting campaign in the rural schools. It is expected the Parent-Teacher Associations will cooperate.

Week of the National Society of World War Registrars in establishing a National System of memorial highways, to be known as Gold Star Highways, memorials to the Gold Star Mothers and their sons in every state, is progressing. Such highways have been designated in more than twenty states. These highways may be marked, either with the large road marker or some modification thereof, between towns, or with memorial trees and the small bronze tree markers in the towns and cities through which the highway passes, Mrs. Charles W. Bryan, the national secretary, reports. More than eight hundred trees have been planted in the Gold Star Court of Honor in St. Louis. There will be several hundred in Des Moines; there are to be ninety in Davenport. These are identical with similar memorial boulevards all over the country.

Mrs. W. H. Pittwood, chairman of the Emblem Committee of the Woman's Century Club of Seattle, has started a movement to make the Douglas fir tree the emblem of the State of Washington. This movement has the hearty endorsement of the Forest Club of the College of Forestry.

American War Mothers of Bowling Green and the National Dixie Highway of Bowling Green, Ky., are deeply interested in the Gold Star Court of Honor, Mrs. Richard B. Hughes reports. Her section of the highway covers fifty miles; Lady Ann Lauder, of Scotland, and Sir Harry have given their consent to plant evergreen to the memory of their son, Capt. John Lauder, in the "Court of Honor" in Bowling Green.

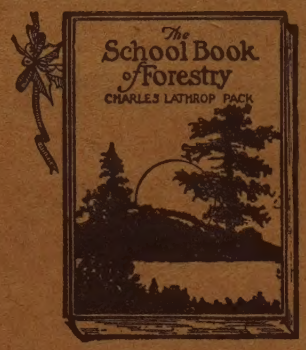
In honor of William M. Jardine, Secretary of Agriculture, a giant juniper tree near Logan, Utah, has been named "Juniper Jardine." The tree has a circumference of about twenty-eight feet. Secretary Jardine was present at the christening, which took place at a reunion of the class of 1904, Utah Agriculture College, of which he is a member.

Forty-three members of the Women's Civic Club of Cleveland Heights have joined the Tree-planting Army, and the names have been registered by Mrs. Louise A. Heller, the president. The city manager, the Dean of the Cleveland School of Art and the Parent-Teacher Association and the landscape architect of the schools aided in the work.

The Smith School of Sioux City, Iowa, is a member of the Tree-planting Army. The registration is made by Mrs. M. P. Summers of the Parent-Teacher Association.

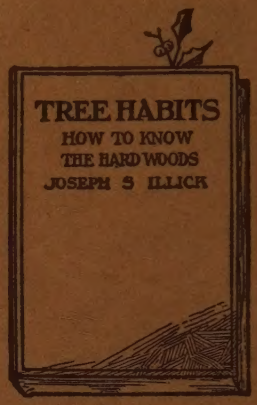
The only way to join The American Tree Association is to plant a tree and register it with the Association, 1214 Sixteenth Street N.W., Washington, D. C. The Association will send tree-planting suggestions and a tree-day program for two cents to pay postage.

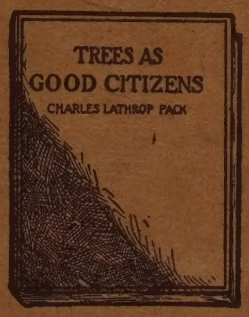
Make These Additions To Your Nature Library



THE majestic forests of America are aptly termed—"her crowning glory." Read this intimate story of their past and present history. Should be in every American home and school. Price $1.00.

KNOW more about the hardwoods. A book of nearly 400 pages, containing the complete history of all these wonderful trees. Especially valuable for libraries, schools, and for every forester, lumberman and dealer in woods. Bound in cloth. Price $4.00.





SPREADING their shade and foliage like a great triumphal arch, trees are essential to every American home. This book, containing 16 beautiful color plates, tells you all about the shade trees. Ideal for the home owner. Cloth bound with gilt lettering. Price $4.00.

THE beautiful monthly periodical that is making Nature so popular. Its fascinating articles on birds, animals, flowers, trees, and other nature subjects and four-color reproductions of famous nature paintings make an ideal gift and a clean and wholesome magazine which is needed in every home. 35 cents a copy. $3.00 per year.

Order from the American Nature Association, Washington, D. C.

NATIONAL CAPITAL PRESS, INC., WASHINGTON, D. C.